CHNOLOGY DEPT.

FEBRUARY 1953

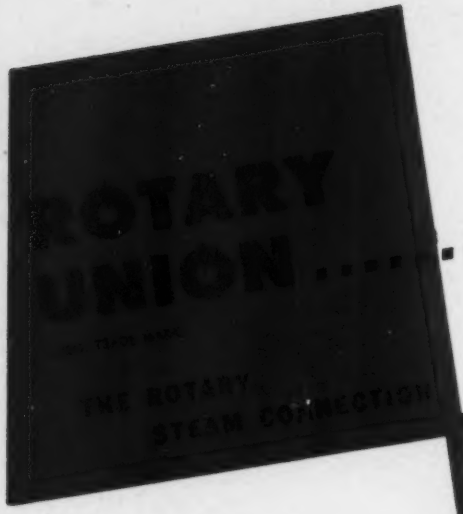
The Paper Industry

PUBLIC LIBRARY
FEB 27 1953
DETROIT

LABORATORY TYPE FILTRATION
ON A MILL SCALE!

with the
WACO
FILTER

IMPROVED
MACHINERY INC.
•
NASHUA, NEW HAMPSHIRE



...The Type "FSG" is trouble-free

Many paper mills report three years or more of service from their Type "FSG" ROTARY UNIONS without one minute's down-time . . . *and without requiring mechanical adjustments of any kind.*

Each ROTARY UNION is carefully pretested for perfect performance. Its construction takes stress and strain from moving and sealing parts. The special "FSG" heavy duty, metal-backed graphite bearing requires no lubrication and permits continuous high speeds under high pressures and temperatures. The ROTARY UNION is self-adjusting to pressure of application. Two point syphon support prevents wearing through and falling off of syphon pipes.

When you specify the Type "FSG" ROTARY UNION for your dryers, calenders, digesters, etc., you get long trouble-free service that saves you money. Contact our nearest office and our direct Factory Sales Engineer will be pleased to discuss your particular applications . . . or write Dept. 2P for our catalog.

Type "FSG" ROTARY UNION

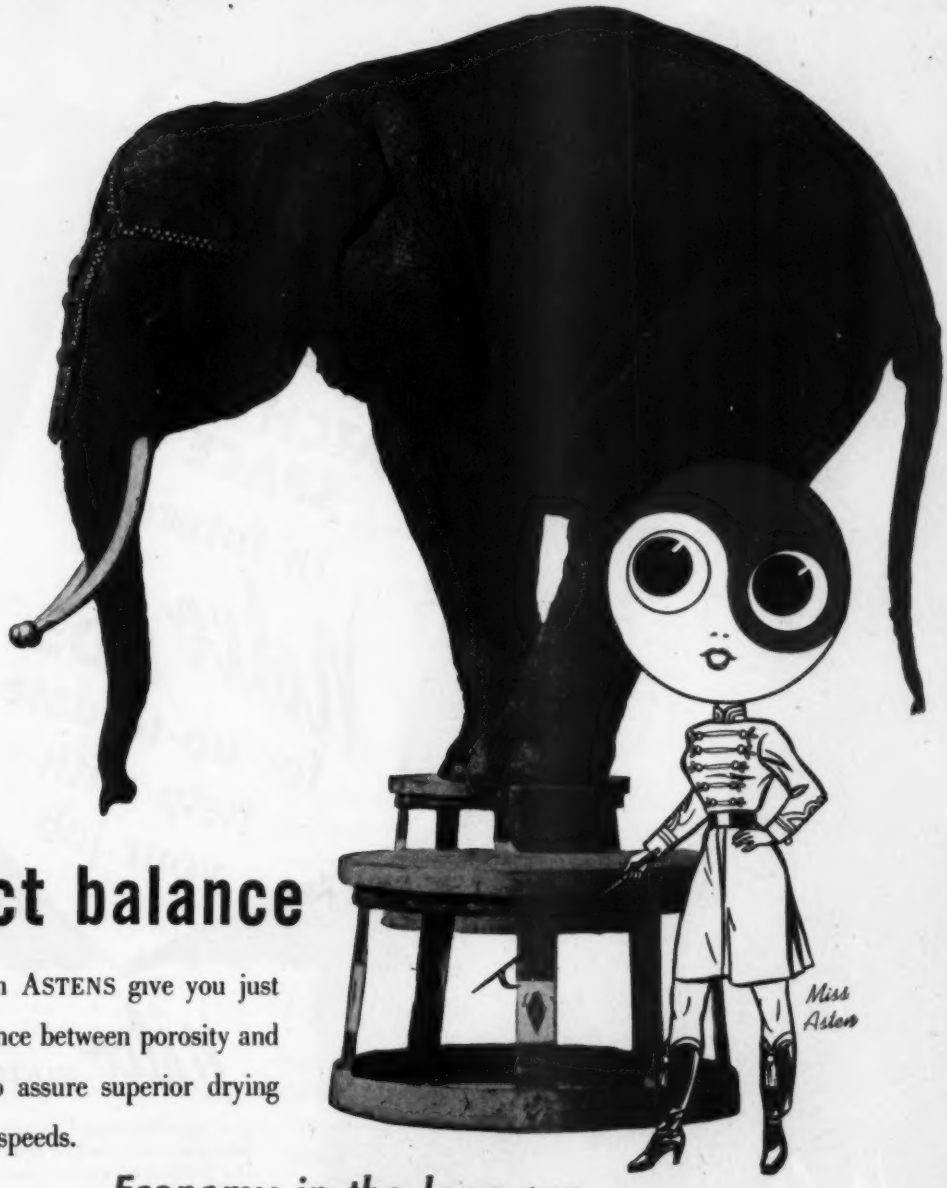
"WHERE *Good Connections* COUNT"
REG. U. S. PAT. OFF.

PERFECTING SERVICE COMPANY

332 Atando Ave. (Home Office and Factory) Charlotte, N. C.

Offices in Chicago • Atlanta • Philadelphia • Providence • New York
Cleveland • Montreal • Toronto

Asten DRYER FELTS



Perfect balance

Custom-woven ASTENS give you just the right balance between porosity and absorbency to assure superior drying at maximum speeds.

Economy in the long run

ASTEN-HILL MFG. CO.
PHILADELPHIA, PENNA.

ASTEN-HILL LIMITED
VALLEYFIELD, QUEBEC

Nalco®

Serving Industry Through Practical Applied Science

NATIONAL ALUMINATE CORPORATION
6216 West 66th Place • Chicago 38, Illinois
In Canada: Alchem Limited, Burlington, Ontario

Nalco WATER TECHS*

*Few men interested in water technology and practices have time or opportunity to read all the published articles and technical papers which deal with the industrial aspects of water treatment and use. To help overcome this difficulty, *Nalco Water Techs* will provide a listing of carefully selected articles and papers which are reprinted by Nalco in pamphlet form for free distribution upon request by interested readers. Your requests will involve no obligation whatever . . . This addition to Nalco advertising is being undertaken solely as a further Nalco contribution to the better understanding and use of modern water technology.

P

P
P

V

S

E

N

E

P

C

A
E

C

C

I

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 34 • NUMBER 11 • FEBRUARY, 1953

Features . . .

Increased efficiency with dial 'phones at Camas 1319

Wisconsin anti-pollution progress ranks high in world 1324

Newsprint demand to be met by production 1327

Research in forest insect and disease control 1332

Nekoosa-Edwards expansion 1344

New paper machine completes Nekoosa-Edwards program 1346
by B. L. Kassing

Job evaluation . . . top management's role and responsibility 1351
by J. A. Keller

New urea formaldehyde resins for wet strength 1352

X-ray calculator for identifying elements 1354
by V. W. Palen

Paper and paperboard making—XXVI 1356
by Harry Williamson

Centrifugal pumps—Part 23 1358
by Igor J. Karassik and Roy Carter

News . . .

News of the Industry 1319

Association News 1363

Names in the News 1366

Necrology 1372

Safety News 1374

Departments . . .

Editorial 1311

Current Comment 1313

Financial Reports 1313

Paper Sketches 1361

Coming Events 1365

Foreign Abstracts 1376

New Products 1381

New Literature 1386

Current Market Quotations 1392

Index to Advertisers 1394

The PAPER INDUSTRY is indexed regularly in Engineering Index and Industrial Arts Index. An index to each volume is issued annually by the publisher as a part of the April number.

Copyright 1953, by Fritz Publications, Inc.

Published monthly by:
FRITZ PUBLICATIONS, INC.
Edward B. Fritz (1869-1939), Founder

Publication Staff:

President and General Manager
A. SCOTT DOWD

Vice President and Treasurer
A. C. L. FRITZ

Secretary
A. C. BRUCE

Editorial Director
A. W. J. DYCK, Ph.D.

News Editor
D. W. ZEIGLER

Editorial Assistant
CAROL M. JOHNSON

Production Manager
EDGAR C. FARREN

Circulation Manager
STANLEY E. BOIE

Advertising Representatives:

BOSTON 16: Meade & Company, 471 Statler Building, Liberty 2-9677.

CHICAGO 5: John D. Henderson, 431 South Dearborn Street, Wabash 2-3543.

CLEVELAND: L. M. Perkins, 1199 Dorsh Road, South Euclid 21, Ohio, Evergreen 1-3232.

LOS ANGELES: Murray Bothwell, 234 East Colorado St., Pasadena, Calif., Ryan 1-9155.

NEW YORK 20: L. S. van Nydeck, 9 Rockefeller Plaza, Circle 7-3085.

NEW YORK 25: H. A. Johnston, 945 West End Avenue, Academy 2-6984.

PORTLAND: Murray Bothwell, 234 East Colorado St., Pasadena, Calif., Ryan 1-9155.

SAN FRANCISCO: Murray Bothwell, 234 East Colorado St., Pasadena, Calif., Ryan 1-9155.

SEATTLE 4: Arthur G. Neitz, 914 Second Avenue, Eliot 1769.

THE PAPER INDUSTRY—founded in 1919—known as "The Paper Industry and Paper World" from June, 1939, through December, 1949, assumed its original title with the January, 1950, issue.

Published at 404 North Wesley Avenue, Mount Morris, Illinois.

Address all correspondence intended for publication to Editorial and Executive Office, 431 South Dearborn Street, Chicago 5, Illinois.

Member: Audit Bureau of Circulations, The Associated Business Publications.

Entered as second class matter December 13, 1948, at the post office at Mount Morris, Illinois, under the Act of March 3, 1879.

Subscription rates: United States, U. S. Possessions, and Canada, $3.00 for one year, $5.00 for two years, $6.00 for three years. All other countries, $8.00 for one year, $18.00 for three years, payable in advance in U. S. Funds.

more tonnage
reduced costs
improved quality
greater efficiency

with the

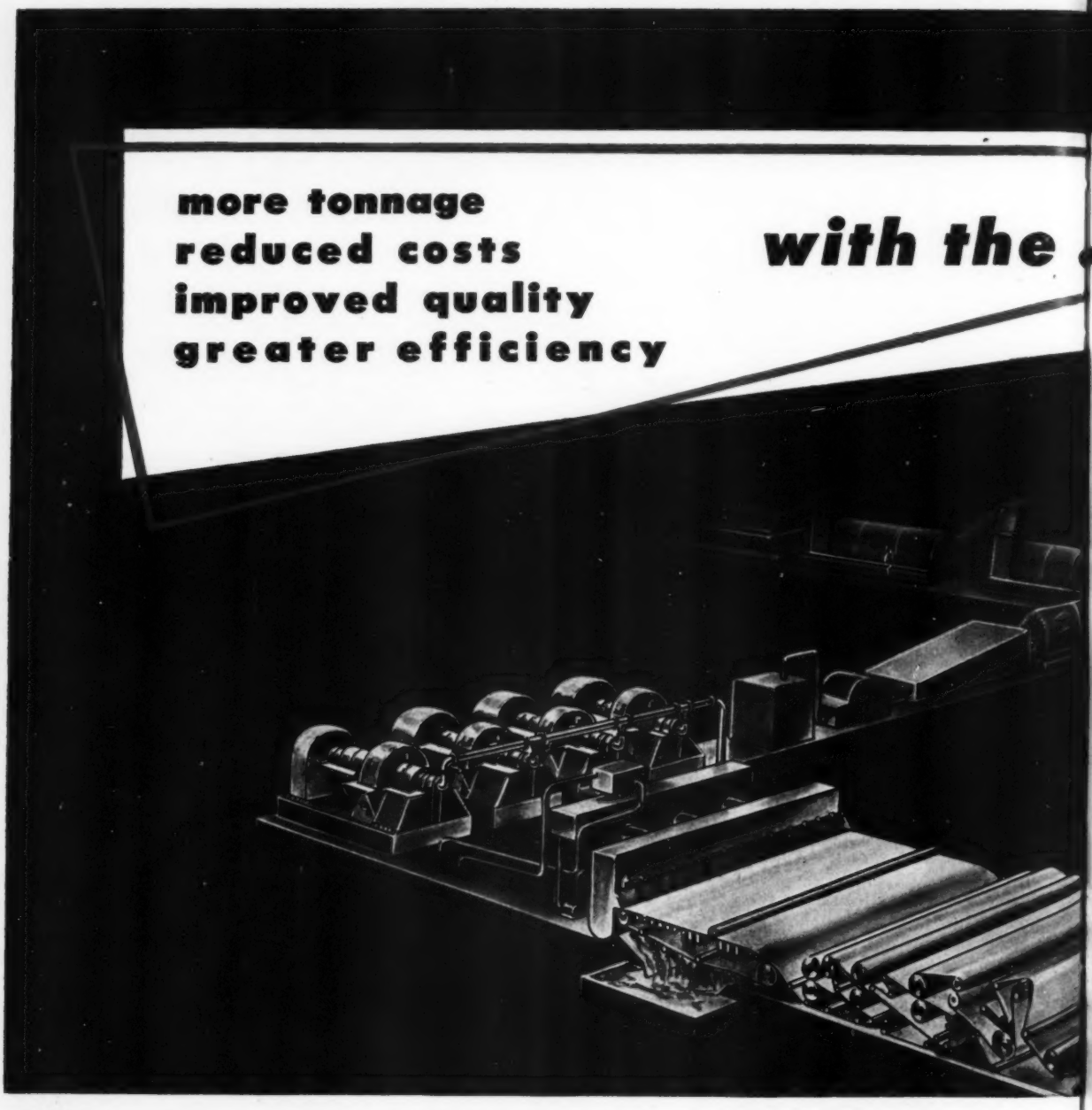
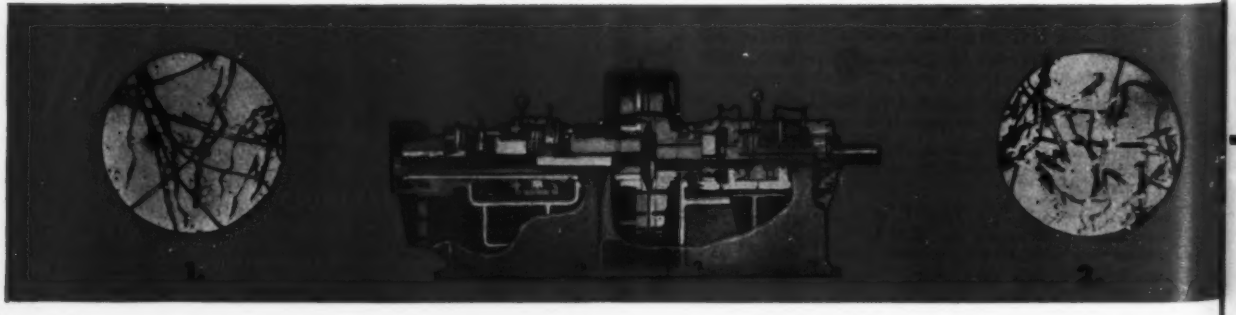


FIGURE 1. A typical Sutherland-treated pulp. Note the length of the fibrils, many of which are still attached to the parent fibers. Thoroughly beaten and refined, the fibers have, nevertheless, not been seriously weakened and chopped up in the process.

FIGURE 2. The effect produced by a Jordan on the same pulp at the same freeness. It can be seen that the fibers have been chopped up into segregated fines, impairing fiber quality and sacrificing many desirable qualities in the finished product



. . . SUTHERLAND REFINER

As a result of the Sutherland Refiner's controlled, continuous beating process you get a controlled fiber quality. This means:

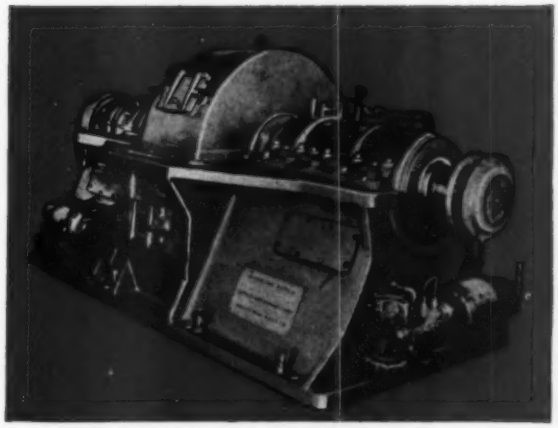
1. Day in and day out—the *right* fiber qualities to meet the required sheet specifications. *Improved quality. Dependable quality.*

WITH THESE ADDITIONAL ADVANTAGES . . .

2. *HIGHER TONNAGE* . . . On a wide variety of applications, Sutherlands have repeatedly demonstrated their ability to produce quality products at increased machine speeds because of the faster drainage and drying qualities of Sutherland treated pulps. This means greater production . . . higher tonnage . . .

3. *REDUCED OPERATING COSTS* . . . Lower power and maintenance costs—plus increased production—mean a substantial reduction in operating costs per ton of paper . . . add up to one of the essential features of mill modernization.

4. *HIGHER OPERATING EFFICIENCY* . . . Less down time, less rejected paper, and low floor space requirements result in more tons of quality paper year in and year out . . . increased efficiency . . . and greater profit.



These are the advantages of Sutherland Refiners, advantages that are being demonstrated by more than 400 Sutherlands in mills throughout the country. Write for your copy of an article outlining one mill's experience. It will be furnished promptly . . . without obligation.

We're sure you'll find it *very* interesting—it *could* well be *your* experience.

SUTHERLAND REFINER CORPORATION

TRENTON 8, NEW JERSEY

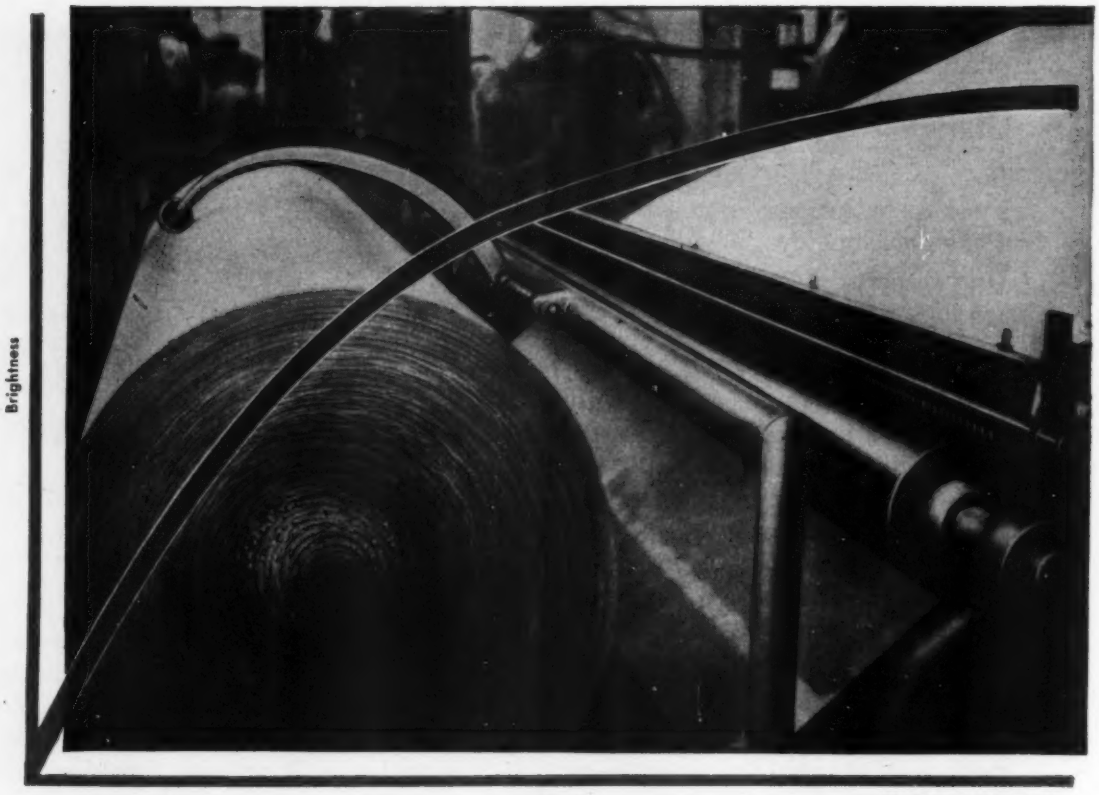
BREAKER TRAPS • PRESSURE WASHING • HIGH YIELD SYSTEMS

MANUFACTURED BY—
VALLEY IRON WORKS CO., APPLETON, WISCONSIN

High Density Bleaching of Chemical and Mechanical Pulps with Hydrogen Peroxide

BECCO

HYDROGEN PEROXIDE AND OTHER PEROXYGEN CHEMICALS



Bleach Liquor Application on the Kamyr machine

Chemical and mechanical pulp webs and cut chemical pulp sheets can now be bleached at much higher chemical concentrations and at higher chemical efficiency than heretofore. Color stability for reasonable periods of time is excellent.

The new Becco high-density method is suitable for use on any self-sustaining web-producing machine or cut sheets can be bleached by the mill previous to use. Equipment requires a minimum of valuable mill space.

Methods and equipment for semi-automatic or fully automatic high-density pulp sheet bleaching are in an advanced stage.

For full information write Becco or talk with any Becco representative.

Buffalo Electro-Chemical Company, Inc.

fmc

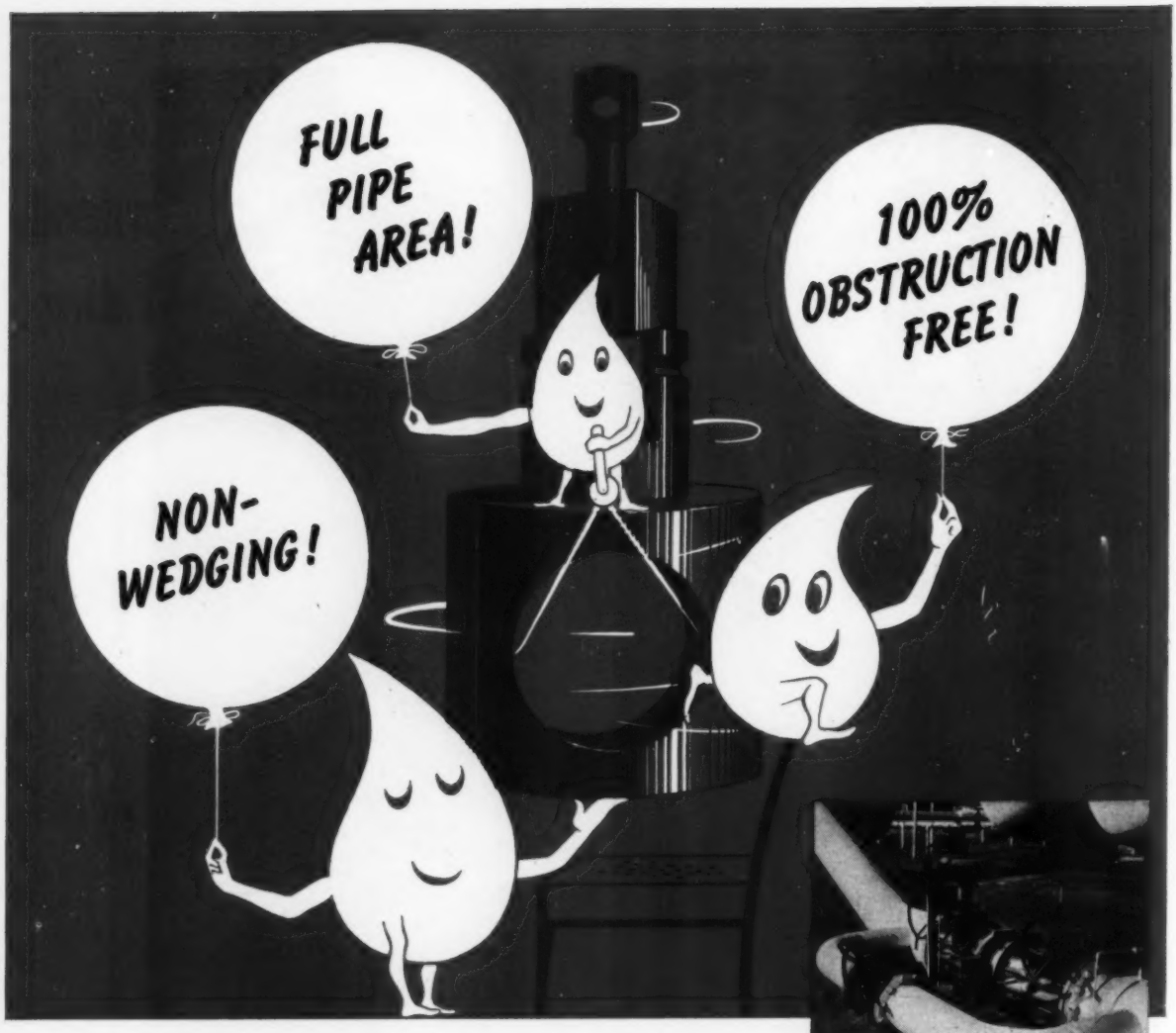
DIVISION OF FOOD MACHINERY AND CHEMICAL CORPORATION

Sales Agent: BECCO SALES CORPORATION, Station B, Buffalo 7, N.Y. • Buffalo • Boston • Charlotte • Chicago • New York • Philadelphia • Vancouver, Wash.

PACIFIC-NORTHWEST—another in a series of scenes... areas where Appleton Wires serve the paper industry.

THE PACIFIC-NORTHWEST...a backdrop of primitive grandeur brought alive by the power-giving Columbia cascading out to the blue Pacific. Here, too, midst a mingling of backwoods and metropolis, fighting fish, canneries, lumber mills and freshly irrigated agricultural wealth, you'll find the paper industry. And, practically all of these mills already know that *Appleton Wires are Good Wires!*

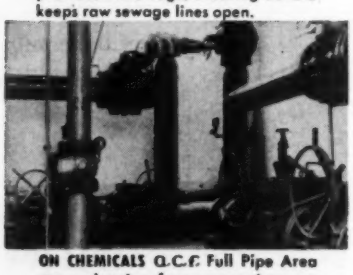
APPLETON WIRE WORKS, INC., APPLETON, WISCONSIN



ON NATURAL GAS a.c.f. CYLINDRICAL Plug Valves have no obstruction to flow, quick quarter-turn shut-off.

This a.c.f. Full Round Port CYLINDRICAL PLUG VALVE—with all its sound, true economy features—is made especially for critical installations where uninterrupted, fast flow is a necessity. a.c.f. Round Port Valves are available in sizes up to 12 inches. a.c.f. Rectangular Port Valves also offer full pipe area. *And here's a new, added feature!* a.c.f. Valves are now available with TEFLON head gaskets, for easier turning, greater protection against leakage on difficult services. When next you specify, why accept less—ask for a.c.f.

IN SEWAGE PLANTS the a.c.f. Valve provides knife-edge, shearing action, keeps raw sewage lines open.



ON CHEMICALS a.c.f. Full Pipe Area stops abrasion from suspensions, no contamination of ladings.

a.c.f. CYLINDRICAL FULL PIPE AREA PLUG VALVES

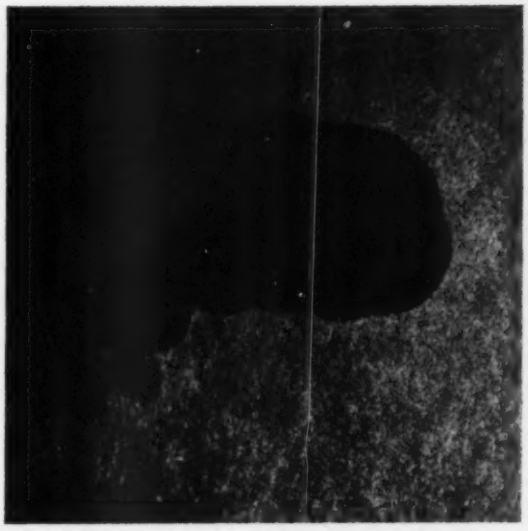
Write for Catalogue 4-PI, American Car and Foundry Co., Valve Division, 1501 E. Ferry Ave., Detroit 11, Mich.

Representatives in 50 Principal Cities

BLOTTER TEST PROVES

Kelsize Solution Controls Penetration of Porous Surface

This unretouched photograph shows a 1% solution of Kelsize twenty minutes after being puddled on blotter. Note how solution remains on surface of blotter. This test illustrates that Kelsize is an excellent material for controlling penetration and strike through of aqueous solutions, thus increasing the efficiency of adhesive or surface sizing solutions by retaining them at the area of application.



Here is unretouched photograph of water, without Kelsize, on piece of same blotter, taken seconds after water was placed on blotter. Note how water has immediately passed into blotter compared to controlled penetration of Kelsize solution. Proof that Kelsize and Kelgin are superior surface control agents and regulate surface density and penetration — precisely and effectively.

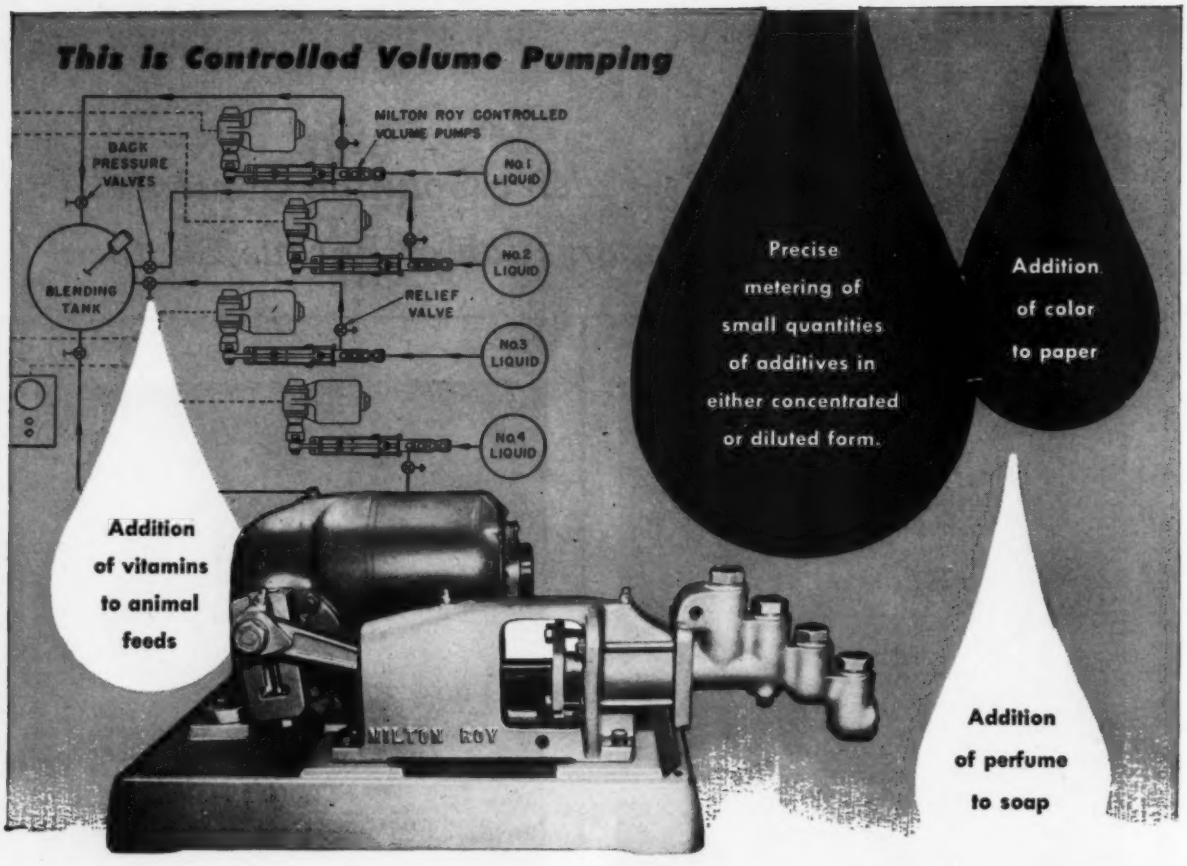
KELSIZE®
and
KELGIN®

Superior Surface Control Agents

Due to their colloidal and film forming properties, Kelsize and Kelgin effectively control penetration of adhesives, starch solutions, and most water base solutions.

products of **KELCO** *company*

20 N. Wacker Drive, Chicago 6, Ill.
31 Nassau Street, New York 5, N. Y.
530 W. Sixth Street, Los Angeles 14, Calif.


This is Controlled Volume Pumping
MILTON ROY CONTROLLED VOLUME PUMPS
BACK PRESSURE VALVES
BLENDING TANK
RELIEF VALVE
NO.1 LIQUID
NO.2 LIQUID
NO.3 LIQUID
NO.4 LIQUID
Precise metering of small quantities of additives in either concentrated or diluted form.
Addition of color to paper
Addition of vitamins to animal feeds
Addition of perfume to soap
MILTON ROY

MILTON ROY CONTROLLED VOLUME PUMPS DO THE JOB

Wherever processes require the addition of liquids in either concentrated or diluted form, Milton Roy Controlled Volume Pumps have ideal application. Among the diversified industries where they are used for this purpose are food and food processing, pulp and paper, soap, pharmaceuticals, cosmetics, petroleum and petrochemicals, textiles and fibres, and brewing.

Continuous controlled volume feeding results in uniform blending of additive with basic product, assures rigid consistency of mixture or color among successive batches. Costly variations in content are avoided by holding delivery accuracy of the additives within a fraction of one per cent for most applications.

Wherever precision liquid component addition or blending is encountered in industry, Milton Roy equipment spells out marked returns in accuracy, efficiency and economy. As air-powered or motor-driven units, as components of automatic systems complete with a variety of automatic controls and accessory equipment, Milton Roy Controlled Volume Pumps give an assured accuracy and uniformity of product often impossible to obtain by any other method. Necessary changes in formulae can be accomplished quickly and accurately by manual or automatic adjustment of controls.

Capacities range from 3 milliliters per hour to about 50 gallons per minute, against pressures up to 25,000 pounds per square inch. Practically any liquid—slurries, suspension of solids, viscous or corrosive chemicals, tars, sludges—can be handled with equally precise efficiency.

For detailed information, call the Milton Roy representative listed in your classified telephone directory. Or write us direct.

Manufacturing Engineers

WITH THE EXCLUSIVE STEP-VALVE DESIGN

MILTON Roy COMPANY

1316 EAST MERMAID LANE, PHILADELPHIA 18, PA.

CONTROLLED VOLUME PUMPS AND AUTOMATIC CHEMICAL FEED SYSTEMS

IF IT'S

Tonnage

YOU'RE AFTER

positive control, improved stock,
greater flexibility and lower cost

E.D. Jones

Fibremaster®

IS YOUR ANSWER

The FIBREMASTER has twice the capacity of the famous Jones High-Speed Refiner. Yet its simplified, rugged design requires relatively little floor space.

And it has sacrificed none of the features of the smaller machine . . . its flexibility as a general utility unit for all stocks from news to rag, its improved stock control, economy of power, easy disassembly and low maintenance cost.

If you have a problem in high volume refining, you owe it to yourself to find out more about the FIBREMASTER.

for a more study what the FIBREMASTER can do for your [illegible] quality controls. Write for Publication 253-1054.

E. D. Jones & Sons Company, Pittsfield, Mass.

Now Available with ACCRU-SET — automatic plug adjustment

This latest triumph of Jones engineering provides completely automatic, completely reliable finger-tip control of plug adjustment for uniform, pre-determined power throughout your stock run. Guarantees more uniform stock treatment, less operating horsepower, plus positive protection for plug and shell bars if power or stock flow fails.

Easily installed on any Jones Jordan, Fibremaster or Refiner. Write today for details.

E.D. Jones

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

CHEMICAL USERS' GUIDE To General Chemical Products for the Paper Industry

PRODUCT	AVAILABLE FORMS	COMMERCIAL STRENGTH (MIN.)	SHIPPING CONTAINERS	APPLICATIONS
Aluminum Sulfate $Al_2(SO_4)_3 \cdot 14H_2O$ approx. *(Alum)*	Commercial & Iron Free: Lump, Ground Powdered	17.25% Al_2O_3	Bags Bulk Carloads	Precipitation of rosin size and filler; water clarification; manufacture of satin white; pitch control; mordant for dyes.
Aluminum Sulfate $Al_2(SO_4)_3$ + water *(Liquid Alum)*	Liquid	32° Be (total Al_2O_3 7.2%)	Tank Trucks Tank Cars	Same as commercial dry product but lower strength.
Salt Cake Na_2SO_4	White or Grayish Granules	95-99% Na_2SO_4	Bags Bulk Carloads	Used in kraft cooking liquors as the source of Na_2S.
Glauber's Salt, Crystal $Na_2SO_4 \cdot 10H_2O$ *(Sodium Sulfate)*	Colorless Crystals	96% $Na_2SO_4 \cdot 10H_2O$ (42.3% Na_2SO_4)	Bags Barrels Fibre Drums	Substitute for salt cake in kraft cooking liquor.
Glauber's Salt, Anhydrous Na_2SO_4 *(Sodium Sulfate)*	White Granules	99.9% Na_2SO_4	Bags Bulk Carloads	Same as Crystal but stronger product.
Sulfuric Acid H_2SO_4	Liquid	66° (93.19%), 99% 20% oleum and higher strengths	Carboys Steel Drums Tank Trucks Tank Cars	Wire souring; parchmentizing; acid wash in last stage of multi-stage pulp bleaching; neutralizing tall oil soaps; pH adjusting.
Hydrochloric Acid HCl + water *(Muriatic Acid)*	Liquid	18° Be (27.92%) 20° Be (31.45%) 22° Be (35.21%)	Carboys Tank Trucks Tank Cars	Wet strength paper.
Sodium Bisulfite, Anhydrous $Na_2S_2O_5$ *(ABS) (Sodium Metabisulfite)*	Powder	97.5% $Na_2S_2O_5$ (Equiv. 65.5% SO_2)	Bags Fibre Drums	Anti-chlor.
Sodium Silicate $Na_2O \cdot XSiO_2$ + water *(Water Glass)*	Liquid	38°, 41°, 42° Be; special and higher strengths	Steel Drums Tank Cars Tank Trucks	Adhesive for corrugated and solid fibre board; used in coating mixtures to reduce viscosity and in beater sizing to stiffen paper. Aid in bleaching & flocculation.
Chromium Potassium Sulfate $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$ *(Potash Chrome Alum)*	Red Violet Crystals	99.5% $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$	Fibre Drums	Used in "save-all" or white water systems.
Aqua Ammonia NH_4OH + water *(Ammonia)*	Colorless Liquid	26° Be (29.4% NH_3)	Carboys Steel Drums Tank Trucks	Used with chlorine to form chloramines for slime control.
Sodium Fluoride	Powder	95% NaF 97% NaF	Multiwall Paper Bags Fibre Drums	Preservative and stabilizer for starch in coating mixtures.
Tetrasodium Pyrophosphate, Anhydrous $Na_4P_2O_7$ *(TSPP) (Pyro)*	White Powder	98% $Na_4P_2O_7$ (Equiv. 52% P_2O_5)	Bags Fibre Drums	Felt washing; pitch dispersion; coating.
Sodium Tripolyphosphate $Na_5P_3O_{10}$ *(Tripoly)*	White Powder	90-95% $Na_5P_3O_{10}$ (Total P_2O_5—56%)	Bags Bulk Carloads	Felt washing; pitch dispersion; coating.
Nitric Acid HNO_3 + water	Liquid	42° Be 67.2% HNO_3	Carboys Drums Tank Trucks	Nitrating pulp; cleaning monel metal.

The products advertised are commercial chemicals having various uses, some of which may be covered by patents, and the user must accept full responsibility for compliance therewith.

BASIC CHEMICALS

FOR AMERICAN INDUSTRY

OTHER PRODUCTS: Sodium Sulfite; Sodium Thiosulfate; Sodium Metasilicate; Trisodium Phosphate; Copper Sulphate; Disodium Phosphate.

FOR THE LABORATORY OR SPECIAL APPLICATIONS: BAKER & ADAMSON REAGENTS and FINE CHEMICALS

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

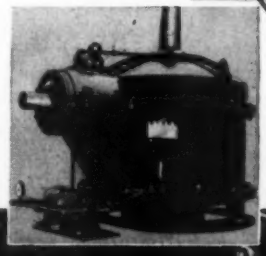
Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte Chicago • Cleveland • Denver • Detroit • Greenville (Miss.) • Houston • Jacksonville • Kalamazoo Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Providence • St. Louis San Francisco • Seattle • Yakima (Wash.)

In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

THE KEY TO FASTER PRODUCTION... REDUCED COSTS... BETTER QUALITY

Downingtown Fibrepulpers



(*Upper left*) Spiral bevel gear drive requires no special hypoid lubricant... is easy to maintain.

(*Left*) General view of three Downingtown Fibrepulpers. Note continuous junk and rag remover which is part of the Continuous Fibrepulper in left foreground.

(*Below*) Showing how scrap paper charge is fed on to conveyors to two Batch and one Continuous Downingtown Fibrepulpers requiring minimum labor.

NEW INSTALLATION AT CERTAIN-TEED PRODUCTS CORP., PRYOR, OKLA., INDICATES ADVANTAGES OF AN INTEGRATED PULPING SYSTEM

The use of Downingtown Continuous and Batch Fibrepulpers, as the illustrations on this page show, results in substantial savings in the handling of stock charges, reduces space requirements and speeds the production of properly prepared pulp for the stock chests. The Downingtown installation at Certain-teed Products Corp. is designed to provide stock for a top liner, filler and bottom liner on a Downingtown modernized seven cylinder board machine.

In addition to the advantages shown here, by specifying Downingtown Fibrepulpers, efficiency and quality are increased through more uniform pulping, higher freeness, controlled fineness and faster pulping cycles.

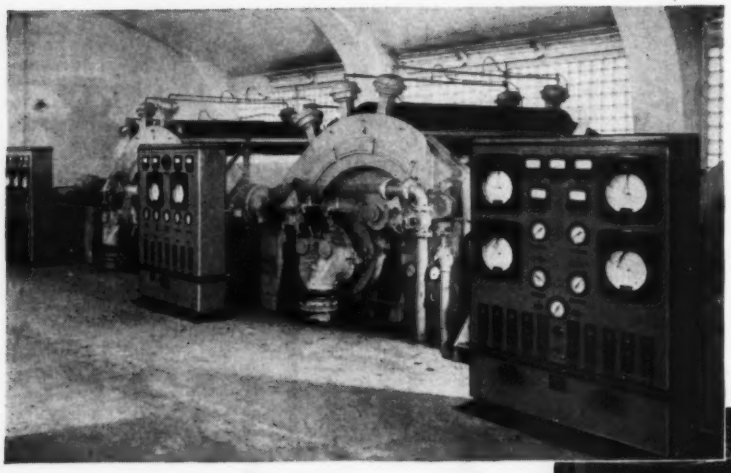
DOWNINGTOWN MANUFACTURING CO.
DOWNINGTOWN, PA.

West Coast Representative:
John V. Roslund, Pacific Building, Portland 4, Oregon

Manufactured in Canada by
Waterous Limited
Brantford, Ontario

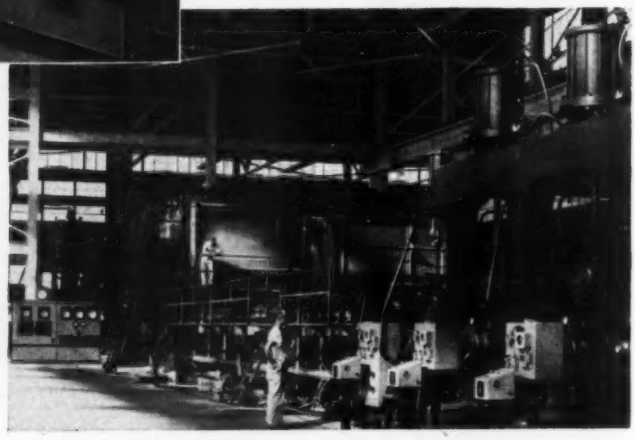
DOWNINGTOWN
FIBREPULPERS
MODERNIZATION IS PROFITABLE

DESIGNERS AND BUILDERS OF PAPER, BOARD AND FELT MACHINES SINCE 1840



◀ *pH control in your bleach plant will improve quality and save chemicals.*

pH control on your paper machine will improve and maintain quality and permit higher machine speeds. ▼



Better Mill operation... Better finished product...

with Foxboro pH Measurement and Control Systems

Wherever pH is an important factor in your process, automatic measurement or control by Foxboro instrumentation can bring big improvements in results. It means brighter pulp in bleaching with minimum chemical usage . . . better quality paper at higher machine speeds . . . more reliable machine operation . . . or any of a number of other advantages.

BASED ON DYNALOG ELECTRONIC INSTRUMENTS

Designed with the Foxboro Dynalog* as the basic instrument, Foxboro pH systems take full advantage of the greater sensitivity and reliability of electronic circuits. The Dynalog provides flawless, *stepless*, continuous measurement or control through use of a simple variable capacitor. It has no slidewire, no batteries to standardize, no high-speed motor, gears or galvanometer. Maintenance is eliminated, except for occasional replacement of standard radio tubes. Available in recording or recording-controlling models.

Beckman glass electrodes are the primary measuring elements of Dynalog pH systems. They are suitable for use in nearly all types of liquids, regardless of color, viscosity, rate of flow, suspended solids, oxidizing or reducing agents.

WRITE FOR COMPLETE INFORMATION

Whatever your requirements, there is a Foxboro Dynalog pH System to meet them. Consult your nearest Foxboro representative — or write for Bulletin 430. **The Foxboro Company, 822 Neponset Ave., Foxboro, Mass., U.S.A.** Branch offices in principal cities.

*Reg. U. S. Pat. Off.

FOXBORO
REG. U. S. PAT. OFF.

RECORDING · CONTROLLING · INDICATING
INSTRUMENTS

Saves Time, Money, Material

ON CHICAGO CARTON COMPANY
LAMINATING MACHINE

AND CUT-OFF

Oilgear drive installed in 1934 operates 16 hours daily at low cost. Gives maximum production on all stocks with little spoilage or non-productive time

A laminating machine and a cut-off in the plant of the Chicago Carton Company are driven in synchronism by Oilgear Fluid Power Equipment installed in 1934. A trip to the plant reveals today the compact, sturdy Oilgear equipment on the lower floor performing quietly, efficiently and continuously 16 hours a day in the necessarily humid atmosphere. Maintenance records indicate a total expenditure of $93.21 during the 16 years for service and parts, less than $6.00 a year. Because of the full flexible speed range and easy controllability of the Oilgear drives, the laminating machine is operated at speeds that best fit the type of board being processed and the cut-off drive follows in synchronism to cut stock into uniform lengths.

Another Oilgear feature important here is the unusual speed with which the laminating machine drive and cut-off drive can be started and stopped. This feature of Oilgear smooth, high speed acceleration and quick hydro-dynamic braking reduces non-productive time and cuts spoilage of sheets to a bare minimum.

On the basis of the 16 year performance of Oilgear, the Chicago Carton Company recently installed another Oilgear drive on a new 125 hp installation.

Time after time, Oilgear demonstrates its superiority and dependability on variable speed drives. Oilgear Fluid Power has many advantages. Investigate them now. THE OILGEAR COMPANY, 1578 W. Pierce St., Milwaukee 4, Wis.

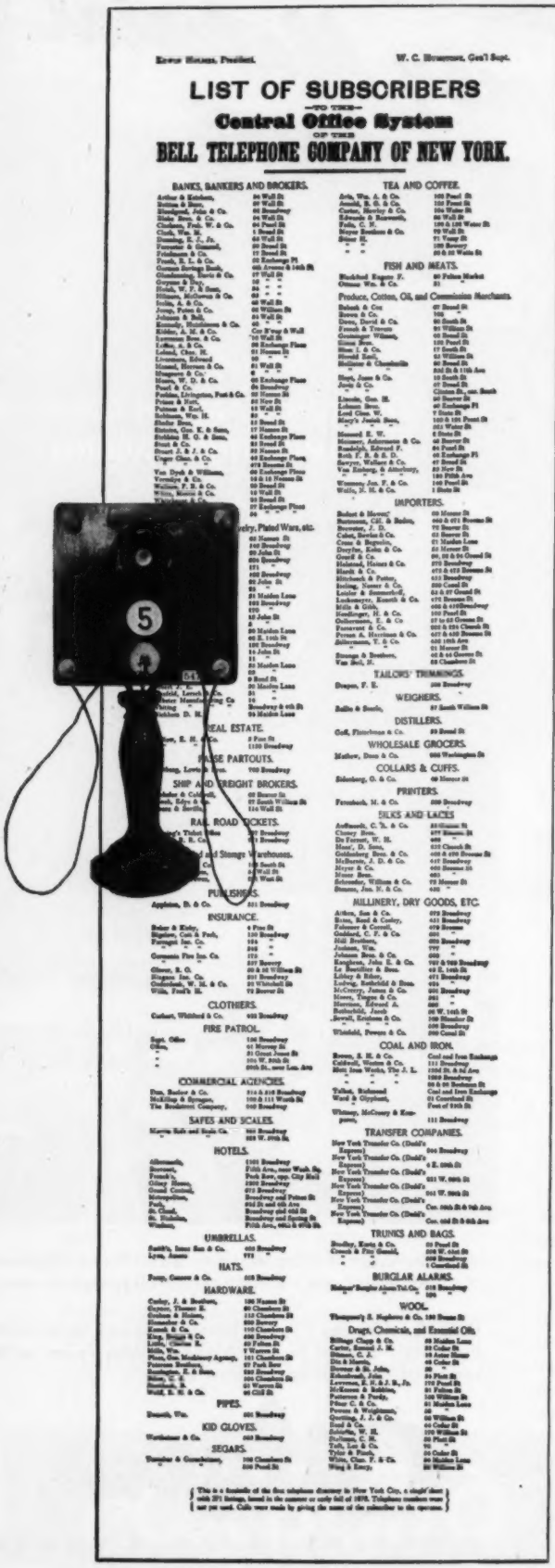
UPPER—Oilgear 40 hp Variable Speed Drive with electric pilot motor remote control and oil reservoir base.

LOWER—Oilgear 7½ hp Variable Speed Drive with automatic control to synchronize cutter speed with speed of laminating machine drive.

Oilgear

PIONEERS IN FLUID POWER

PUMPS, TRANSMISSIONS, CYLINDERS AND VALVES



Enos Hotchkiss, President. W. C. Brownell, Gen'l Supt.

LIST OF SUBSCRIBERS

—TO THE—

Central Office System

OF THE

BELL TELEPHONE COMPANY OF NEW YORK.

BANKS, BANKERS AND BROKERS.

Arthur & Belden, 30 Wall St
Bottum & Bate, 49 Wall St
Buckland, John & Co. 66 Broadway
Blake Bros. & Co. 64 Wall St
Chisholm, Fred. W. & Co. 64 Pearl St
Clark, Wm. M. 1 Broad St
Dimon, E. C., Jr. 64 Wall St
Forrester & Gaussel, 59 Broad St
Fotchmann & Co. 17 Broad St
Frank, E. L. & Co. 35 Exchange Pl
German Savings Bank, 660 Avenue A, 14th St
Glendenning, Davis & Co. 57 Wall St
Guyenet & Doty, 56 " "
Hoish, W. F. & Son, 54 " "
Hulbert, McGowan & Co. 62 " "
Irvin, A. & Co. 46 Wall St
Josup, Paton & Co. 65 William St
Johnson & Bell, 64 Wall St
Kennedy, Stockton & Co. 65 " "
Kibbler, A. M. & Co. Cor Pine & Wall
Lawrence Bros. & Co. 70 Wall St
Lidke, A. & Co. 58 Exchange Place
Leland, Chas. H. 51 Nassau St
Livermore, Edward 52 " "
Mosnil, Herman & Co. 61 Wall St
Musgrave & Co. 6 " "
Munn, W. D. & Co. 58 Exchange Place
Pearl & Co. 59 Broadway
Perkins, Livingston, Post & Co. 35 Nassau St
Prime & Nott, 52 Nov St
Putnam & Earl, 15 Wall St
Robbins, Wm. H. 84
Shultz Bros. 15 Broad St
Stevens, Geo. K. & Sons, 17 Nassau St
Stebbins H. G. & Sons, 44 Exchange Place
Stout & Co. 51 Broad St
Strupf, J. & J. & Co. 35 Nassau St
Unger Chas. & Co. 48 Exchange Place, 4th Nassau St
Van Dyck & Williams, 56 Exchange Place
Vermilye & Co. 16 & 18 Nassau St
Wallace, F. B. & Co. 50 Broad St
White, Morris & Co. 15 Wall St
Whitehead & Co. 35 Broad St, 37 Exchange Place
Wm. " " 54 " "

...ery, Plated Ware, etc.

Bailey, Thos. 66 Nassau St
Bailey, Thos. 140 Broadway
Bailey, Thos. 20 John St
Bailey, Thos. 896 Broadway
Bailey, Thos. 171 "
Bailey, Thos. 428 Broadway
Bailey, Thos. 20 John St
Bailey, Thos. 21 "
Bailey, Thos. 21 Maiden Lane
Bailey, Thos. 1221 Broadway
Bailey, Thos. 1370 "
Bailey, Thos. 15 John St
Bailey, Thos. 5 "
Bailey, Thos. 20 Maiden Lane
Bailey, Thos. 60 E. 14th St
Bailey, Thos. 1205 Broadway
Bailey, Thos. 14 John St
Bailey, Thos. 11 "
Bailey, Thos. 21 Maiden Lane
Bailey, Thos. 22 "
Bailey, Thos. 9 Bond St
Bailey, Thos. 20 Maiden Lane
Bailey, Thos. 21 "
Bailey, Thos. 14 "
Bailey, Thos. Broadway & 4th St
Bailey, Thos. 24 Maiden Lane

REAL ESTATE.

Bailey, E. H. & Co. 2 Pine St
Bailey, Thos. 1120 Broadway

PARLOR PARTOUTS.

Bailey, Loring & Son. 700 Broadway

SHIP AND FREIGHT BROKERS.

Baker & Caldwell, 68 Beaver St
Baldwin, Edgar S. 57 South William St
Bates & Bertine, 114 Wall St

RAIL ROAD TICKETS.

Bailey's Ticket Office 577 Broadway
Bailey, E. R. Co. 971 Broadway

Bailey and Stonge Warehouse.

Bailey, C. 130 South St
Bailey, C. 54 Wall St
Bailey, C. 130 West St

PUBLISHERS.

Appleton, D. & Co. 311 Broadway

INSURANCE.

Baker & Exley, 4 Pine St
Bigelow, Coit & Peck, 120 Broadway
Farragut Ins. Co. 1054 "
" " 248 "
Germania Fire Ins. Co. 172 "
" " 237 Bowery
Gilbert, R. G. 40 & 42 William St
Hoguet Ins. Co. 201 Broadway
Underhill, W. M. & Co. 21 Whitehall St
Wills, Fred'k H. 72 Beaver St

CLOTHIERS.

Carhart, Whitford & Co. 631 Broadway

FIRE PATROL.

Sage, Otho 126 Broadway
Office, 61 Murray St
" 21 Great Jones St
" 324 W. 30th St
" 60th St., near Lex. Ave

COMMERCIAL AGENCIES.

Dun, Barlow & Co. 314 & 316 Broadway
Mercantile Agency, 160 & 111 Worth St
The Bradstreet Company, 346 Broadway

SAFES AND SCALES.

Marvin Safe and Scale Co. 265 Broadway
" " 265 W. 37th St.

HOTELS.

Albemarle, 1101 Broadway
Barnard, Fifth Ave., near Wash. Sq.
Branch's, Park Row, opp. City Hall
Gilsey House, 1200 Broadway
Grand Central, 871 Broadway
Metropolitan, Broadway and Prince St
Park, 22d St. and 4th Ave
St. Cloud, Broadway and 42d St
St. Nicholas, Broadway and Spring St.
Windsor, Fifth Ave., 46th & 47th Sts.

UMBRELLAS.

Smith's, Isaac Son & Co. 625 Broadway
Lyon, James 571 "

HATS.

Pomp, Conover & Co. 318 Broadway

HARDWARE.

Cooley, J. & Brothers, 136 Nassau St
Cowen, Thomas E. 60 Chambers St
Graham & Hulme, 112 Chambers St
Hunsicker & Co. 550 Bowery
Kenedy & Co. 110 Chambers St
King, Bridge & Co. 426 Broadway
Little, Charles E. 40 Fulton St
Mills, Wm. 7 Warren St
Penn, Geo. Mechinery Agency, 121 Chambers St
Peterson Brothers, 57 Park Row
Remington, E. & Sons, 281 Broadway
Sloan, C. S. 104 Chambers St
Smallwood, S. P. 61 Warren St
Weed, E. W. & Co. 66 Cliff St

PIPES.

Demuth, Wm. 631 Broadway

KID GLOVES.

Werthmann & Co. 443 Broadway

SEGARS.

Vaughan & Gumpbourn, 158 Chambers St
" " 556 Pearl St

TEA AND COFFEE.

Arle, Wm. A. & Co. 160 Pearl St
Arnold, B. S. & Co. 152 Front St
Carter, Hawley & Co. 104 Water St
Edwards & Bosworth, 86 Wall St
Fels, C. H. 128 & 130 Water St
Meyer Brothers & Co. 72 Wall St
Segur C. 71 Vesey St
" " 128 Bowery
" " 60 & 62 Wall St

FISH AND MEATS.

Blackford Eugene F. 80 Fulton Market
Ottman Wm. & Co. 51 "

Produce, Cotton, Oil, and Commission Merchants.

Babcock & Co. 67 Broad St
Brown & Co. 102
Dows, David & Co. 80 South St
French & Towers 95 William St
Grosvenor Wilson, 62 Broad St
Hines Bros. 102 Pearl St
Hunt, L. & Co. 17 South St
Hyndal Zaul, 52 William St
Mallory & Chamberlin 60 Broad St
" " 242 St & 11th Ave
Slagt, Jones & Co. 10 South St
Jayne & Co. 67 Broad St
" " Clinton St., cor. South
Lincoln, Geo. H. 30 Beaver St
Lobnitz Bros. 46 Exchange Pl
Lord Geo. W. 7 State St
Macy's Joseph Sons, 102 & 104 Pearl St
" " 101 Water St
Maxwell E. W. 8 State St
Meissner, Ackermann & Co. 42 Beaver St
Randolph, Edward F. 84 Pearl St
Roth F. B. & S. D. 46 Exchange Pl
Sawyer, Wallace & Co. 47 Broad St
Van Emburg, & Attorney, 80 Nov St
" " " 180 Fifth Ave
Wemmey, Jos. F. & Co. 140 Pearl St
Wolfe, J. H. & Co. 1 State St

IMPORTERS.

Robert & Hoyer, 66 Nassau St
Barbezat, Ch. & Bailey, 660 & 671 Broome St
Brewster, J. D. 72 Beaver St
Cabot, Bowles & Co. 61 Beaver St
Cross & Beguelin, 71 Maiden Lane
Dreyfus, Kahn & Co. 52 Mercer St
Goard & Co. 66, 68 & 70 Grand St
Halstead, Haines & Co. 272 Broadway
Hardt & Co. 672 & 674 Broome St
Hitchcock & Potter, 632 Broadway
Irving, Nesmy & Co. 288 Canal St
Lauler & Sommerhoff, 54 & 56 Grand St
Lindemeyer, Kounth & Co. 472 Broome St
Mills & Gibb, 466 & 468 Broadway
Noellinger, H. & Co. 102 Pearl St
Ostlerman, E. & Co. 57 to 63 Greene St
Passavant & Co. 220 & 222 Church St
Pruan A. Herriman & Co. 457 & 459 Broome St
Silbermann, T. & Co. 165 & 167 Fulton St
" " 61 Mercer St
Strong & Brothers, 46 & 48 Beaver St
Van Beil, H. 88 Chambers St

TAILORS' TRIMMINGS.

Draper, F. E. 288 Broadway

WEIGHERS.

Bolln & Smith, 87 South William St

DISTILLERS.

Coll, Fitzsimons & Co. 89 Broad St

WHOLESALE GROCERS.

Mather, Dean & Co. 288 Washington St

COLLARS & CUFFS.

Edenburg, O. & Co. 69 Mercer St

PRINTERS.

Fernbush, M. & Co. 288 Broadway

SILKS AND LACES

Ashworth, C. D. & Co. 55 Nassau St
Cheny Bros. 477 Broome St
De Forrest, W. H. 488 "
Henry, D. Sons, 535 Church St
Goldsborough Bros. & Co. 459 & 461 Broome St
McBurnie, J. & Co. 447 Broadway
Meyer & Co. 462 Broome St
Mosse Bros. 465 "
Schneider, William & Co. 72 Mercer St
Simons, Jno. N. & Co. 452 "

MILLINERY, DRY GOODS, ETC.

Aitken, Son & Co. 272 Broadway
Bates, Read & Cooley, 451 Broadway
Falconer & Carroll, 272 Broome
Goddard, C. P. & Co. 460
Hill Brothers, 274 Broadway
Jackson, Wm. 777 "
Johnson Bros. & Co. 452 "
Knighton, John E. & Co. 702 & 704 Broadway
Le Boutillier & Bros. 42 E. 14th St
Libbey & Riker, 471 Broadway
Ludwig, Rothfield & Bros. 454 "
McCreery, James & Co. 801 Broadway
Moses, Tegner & Co. 261 "
Sherman, Edward A. 268 "
Rothschild, Jacob 26 W. 14th St
Jewell, Eugene & Co. 108 Bleecker St
" " 696 Broadway
Whitfield, Bowers & Co. 288 Canal St

COAL AND IRON.

Brown, S. H. & Co. Coal and Iron Exchange
Caldwell, Wotten & Co. 111 Broadway
Hunt Iron Works, The J. L. 120th St. & 3d Ave
" " " 1262 Broadway
" " " 59 & 60 Bedloes St
Talbot, Richmond Coal and Iron Exchange
Ward & Gleyboni, 21 Courtland St
" " " Foot of 10th St
Whitney, McCreery & Kneeland, 111 Broadway

TRANSFER COMPANIES.

New York Transfer Co. (Dodd's Express) 261 Broadway
New York Transfer Co. (Dodd's Express) 1 E. 59th St
New York Transfer Co. (Dodd's Express) 211 W. 59th St
New York Transfer Co. (Dodd's Express) 241 W. 59th St
New York Transfer Co. (Dodd's Express) Cor. 59th St & 9th Ave
New York Transfer Co. (Dodd's Express) Cor. 42d St & 9th Ave

TRUNKS AND BAGS.

Bradley, Keats & Co. 19 Pearl St
Cleary & Fay Gamble, 258 W. 42d St
" " " 258 Broadway
" " " 1 Courtland St

BURGLAR ALARMS.

Holmes' Burglar Alarm Tel. Co. 218 Broadway
" " " 199 "

WOOL.

Thompson's E. Sophron & Co. 180 Duane St

Drugs, Chemicals, and Essential Oils.

Billings Clapp & Co. 84 Maiden Lane
Carter, Samuel J. M. 21 Cedar St
Dilworth, C. J. 69 John Street
Dix & Morris, 48 Cedar St
Downer & H. John, 20 "
Edenborough, John 84 Platt St
Lawrence, E. S. & J. R., Jr. 172 Pearl St
McKesson & Robbins, 91 Fulton St
Patterson & Purdy, 100 William St
Price C. & Co. 81 Maiden Lane
Pearson & Weightman, 46 "
Quentigg, J. J. & Co. 64 William St
Read & Co. 60 Cedar St
Schieffelin, W. H. 170 William St
Sullivan, C. H. 59 Platt St
Toth, Lee & Co. 74 "
Tyler & Pinch, 56 Cedar St
White, Chas. F. & Co. 86 Maiden Lane
Wing & Estey, 86 William St

This is a facsimile of the first telephone directory in New York City, a single sheet with 271 listings, issued in the summer or early fall of 1878. Telephone numbers were not yet used. Calls were made by giving the name of the subscriber to the operator.

ON A SINGLE SHEET . . .

NEW YORK'S FIRST

TELEPHONE DIRECTORY

There were 271 subscribers listed in this New York directory published in 1878 . . . a group of adventurous souls who were the first to install this new-fangled device.

Today in the directory issued for the Borough of Manhattan alone, the City of New York lists more than seven hundred thousand numbers.

Here is a measure of progress in communications and growth of population . . . duly recorded on paper. It is but one among many instances where paper has served the public interest and served it well.

In the scientific preparation of paper for its limitless number of uses, Huyck Felts play an important part. We are proud of the confidence the paper-making industry has in our product, and we find it stimulating to think of the strides still to be made.

KENWOOD TEXTILE PRODUCTS

HUYCK FELTS

F. C. HUYCK & SONS • ESTABLISHED 1870
RENSSELAER, NEW YORK

Powell Engineers always look to the future!

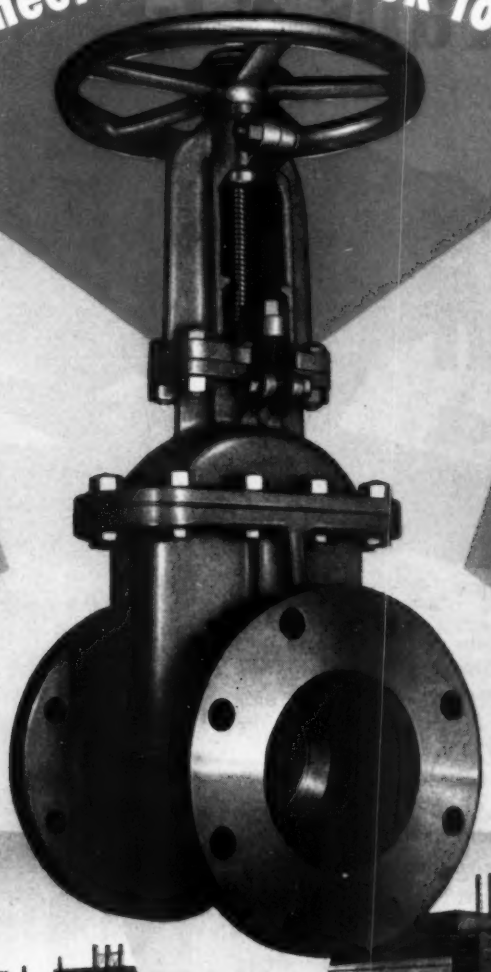


Fig. 2453-G—150-pound O. S. & Y. Gate Valve. Sizes 5" to 30", incl. All dimensions conform to latest standards. Can be furnished in any metal or alloy needed to resist corrosion in Paper Mill services.

DEPENDABLE VALVES SINCE 1846

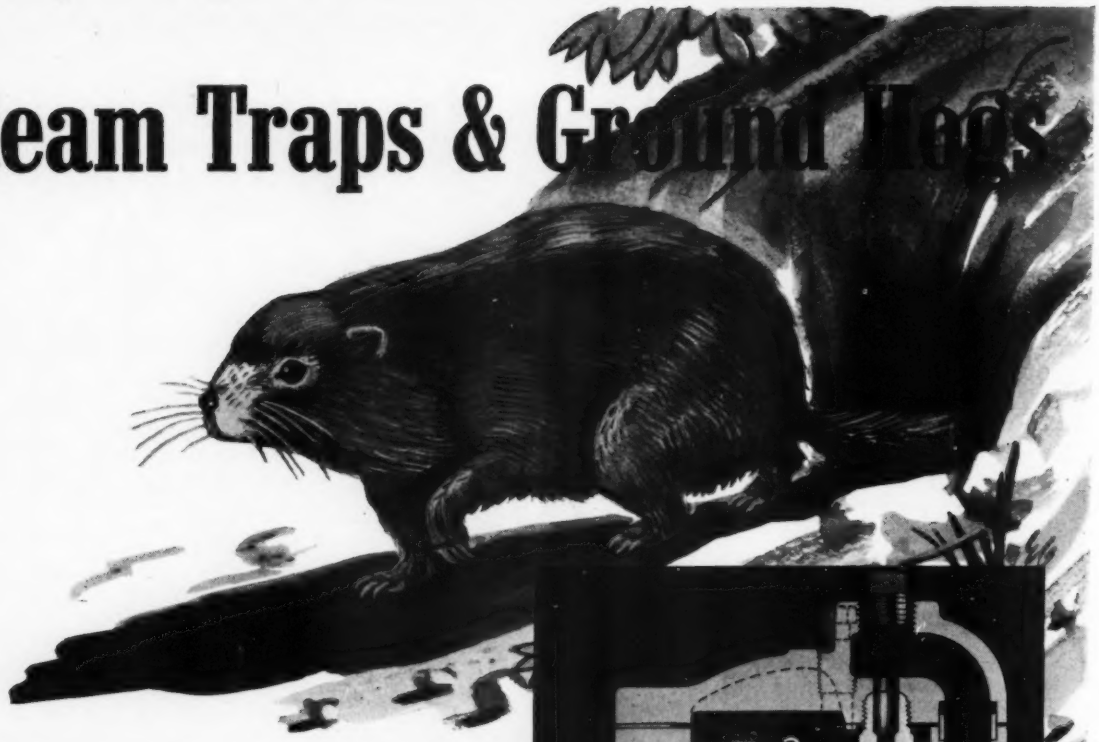
Powell Valves are not only made in every type, size and material needed to meet all your flow control requirements but, because Powell Engineers always look to the future, they give special attention to those important details in design that make all Powell Valves give such long, dependable service and require so little maintenance.

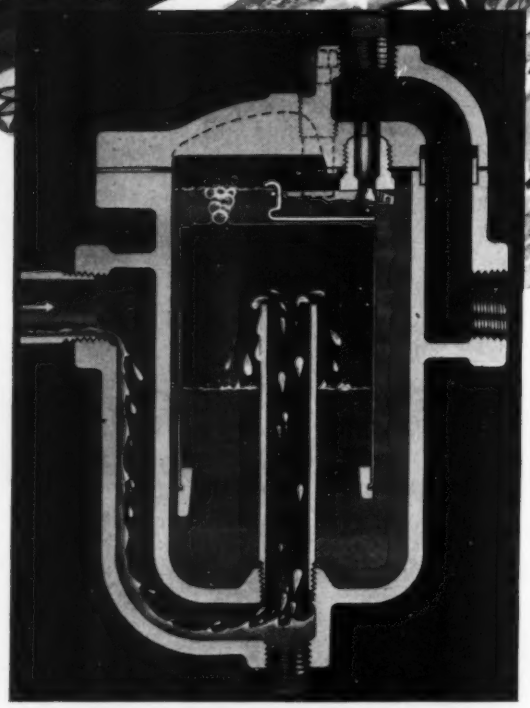
The Wm. Powell Company
Cincinnati 22, Ohio

POWELL

BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES

Steam Traps & Ground Hogs





THERE IS some reason to doubt that the ground hog comes out of his hole every year on February 2, to look for his shadow in order to find out when spring will arrive.

The story is an entertaining bit of folklore that the newspapers keep alive for the fun of it.

There is a bit of folklore about steam traps for paper machine drainage, too. You hear things like this:

1. There are no traps to handle air fast enough.
2. There are none to handle condensate fast enough.
3. There are none that will last long enough.

This folklore isn't true, either. Armstrong Paper Machine Dryer traps answer all these objections very nicely.

Item 1—air venting—Armstrong paper machine traps have over-sized bucket vents sized specially for each dryer, to vent air FAST.

Item 2—condensate capacity—Armstrong paper machine traps, like all Armstrong traps, discharge condensate as fast as it reaches the trap—at steam temperature. There are traps for the largest as well as the smallest paper machine dryers.

Item 3—trap life—Armstrong paper machine traps have stabilizing tubes which eliminate excessive agitation of the buckets, thereby minimizing wear of parts. All parts are made of corrosion and wear-resistant stainless steel except the valve and seat which are chrome steel, hardened, ground and lapped. The result is *long life with low maintenance.*

Send for Bulletin No. 205

The benefits of Armstrong traps for draining paper machine dryers are explained in more detail in this bulletin. You are welcome to a copy. Write to:

ARMSTRONG MACHINE WORKS

816 Hoffman Street, Three Rivers, Michigan

Inverted Bucket Steam Traps • Paper Machine Moisture Controls and Individual Dryer Temperature Controls

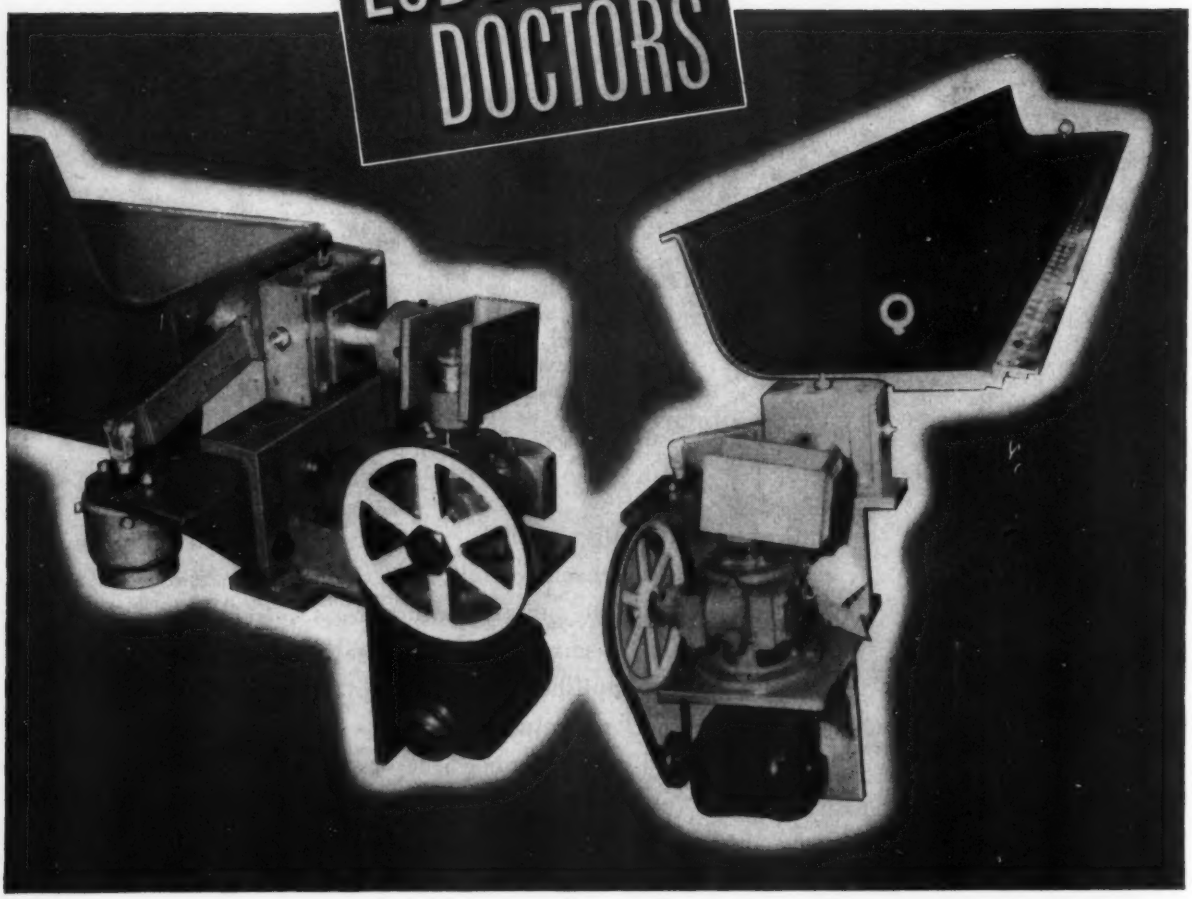
80 years ••• until harvest time!

Douglas fir forests, which supply raw material for most of Weyerhaeuser's mill sites, require 80 years to grow a seedling into a tree of mature size. Contrary to popular belief, only a small part of the total program of reforestation is accomplished by artificial planting and seeding. The primary reforestation job is the restocking of cut over land as old growth timber is harvested. This is being done by natural reforestation with seed supplied from blocks of trees reserved during logging and left standing to reseed the adjacent cut-over area. Where natural seed sources have failed, artificial reforestation by sowing tree seeds with helicopters or mechanical seeders is used.

As more and more virgin timber stands are logged in the forests under Weyerhaeuser management, the harvested land begins growing new trees. As the supply of mature timber diminishes, it will be replaced by a steadily increasing volume of new growth.

There are good possibilities of increasing the yield from this land through silvaculture research and intensified forestry and harvesting practices. Thus Weyerhaeuser's twin goals are a *sustained* and *increased* yield of cellulose products from its 2,500,000 acres of timber land.

LODDING DOCTORS



Modern Oscillating Press Doctors

with pneumatic throw-off

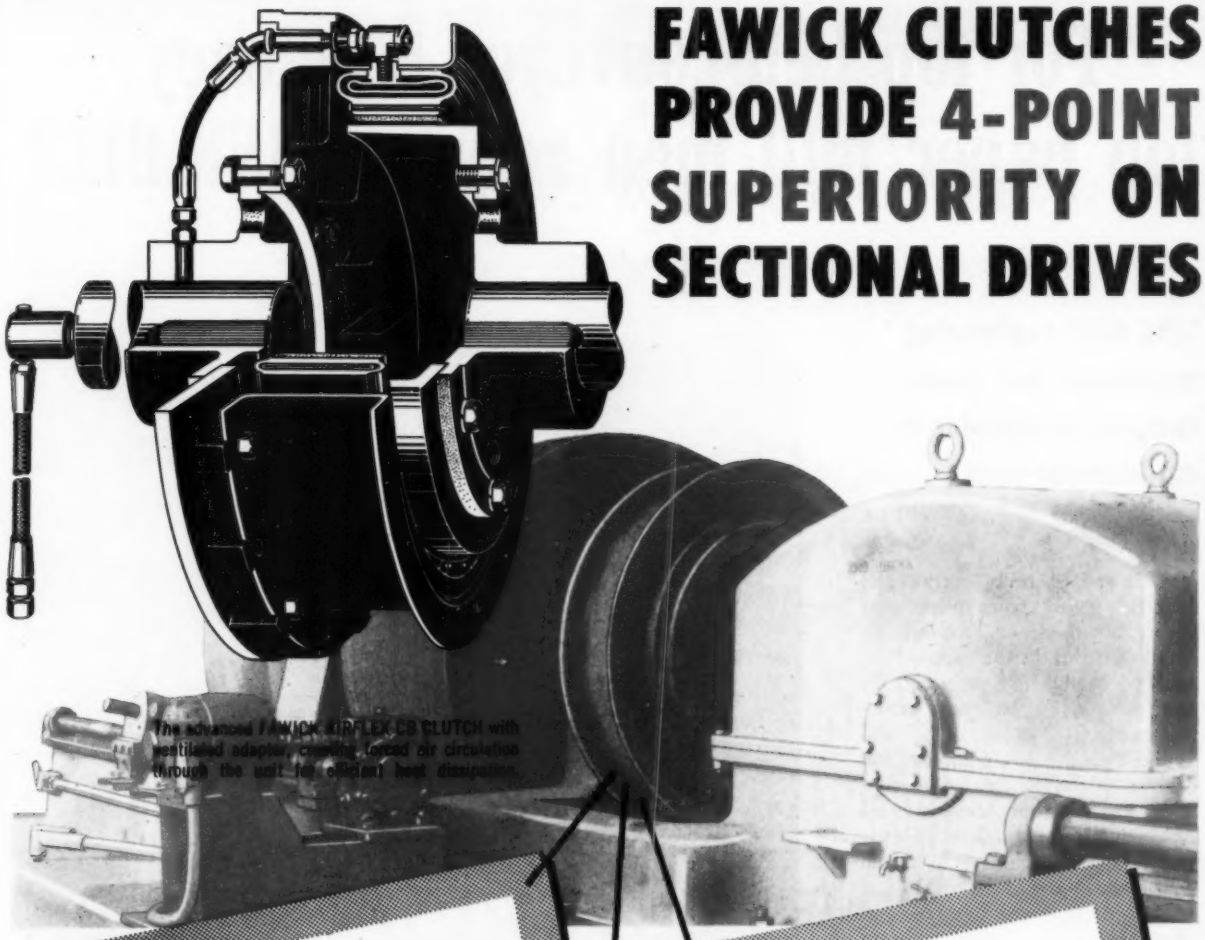
LODDING ENGINEERING CORPORATION

WORCESTER, MASSACHUSETTS

REPRESENTED BY

W. E. GREENE CORPORATION • WOOLWORTH BLDG., NEW YORK

FAWICK CLUTCHES PROVIDE 4-POINT SUPERIORITY ON SECTIONAL DRIVES



The advanced FAWICK AIRFLEX CB CLUTCH with ventilated adapter, showing forced air circulation through the unit for efficient heat dissipation.

1 The ventilated adapter insures cooler clutch operation and more dependable sectional drive performance by eliminating excess heat and wear. Maximum ventilation made possible with FAWICK is particularly advantageous in inching the dryer section.

2 The shock-absorbing flexibility of the FAWICK actuating tube plus the 360° contact with the friction surface provide unmatched clutch smoothness and dependable performance.

3 "New clutch" action at all times is provided by the FAWICK AIRFLEX CLUTCH, which automatically compensates for operating wear.

4 FAWICK units eliminate operating linkages adjustment for wear, and clutch lubrication. They are unmatched in low maintenance cost.

● Fawick Engineering Service is available for the solution of your sectional drive power transmission problems. Call or write the Main Office, Cleveland, Ohio.

FAWICK AIRFLEX DIVISION
FEDERAL FAWICK CORPORATION
9919 CLINTON ROAD • CLEVELAND 11, OHIO

For further information on Fawick Industrial Clutch and Brake Units, write to the Main Office, Cleveland, Ohio, for Bulletin 400-A.

FAWICK Airflex

INDUSTRIAL CLUTCHES AND BRAKES

For top belt-conveyor efficiency, top paper mill men rely on LINK-BELT

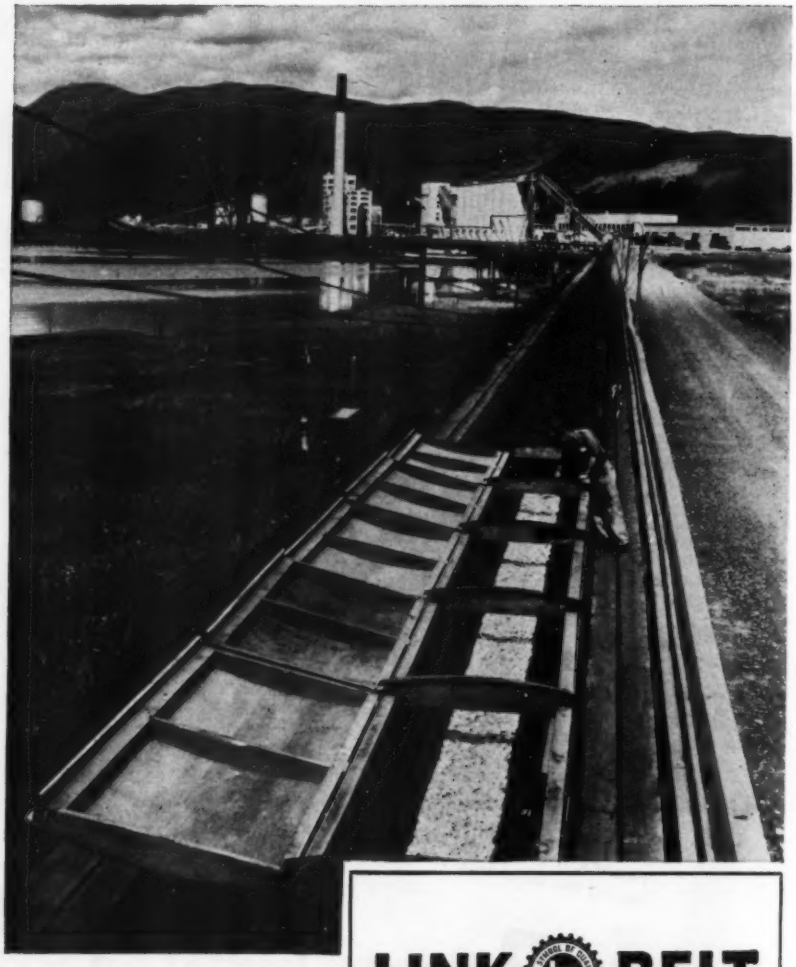
LINK-BELT engineering experience plus quality components combine to cut handling costs

Yes, in paper mills everywhere, Link-Belt is first choice in belt conveyors. Whether your job is large or small, Link-Belt can apply unequalled engineering experience to meet the conditions of your particular system.

Link-Belt builds a complete line of quality components. Our conveyor engineers can choose from all types and sizes of idlers, trippers and terminal machinery to match your exact requirements.

Link-Belt can also supply all related equipment — other types of conveyors, feeders, elevators, car dumpers and shakers. And Link-Belt will build your supporting structures and enclosures . . . install the job completely if desired.

Link-Belt will gladly work with your engineers or consultants. Get in touch with your nearest Link-Belt office.



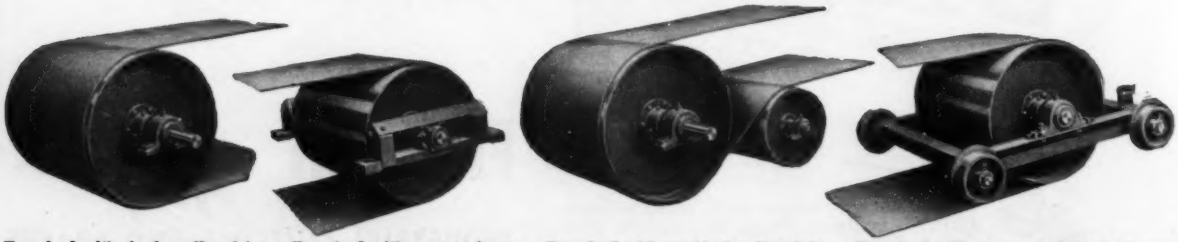
Wood chips are carried from screens in pulp mill wood room to digesters on Link-Belt 24 in. wide belt conveyor system, using side rolls set at 45° for greater capacity.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices in Principal Cities. 12,747-B

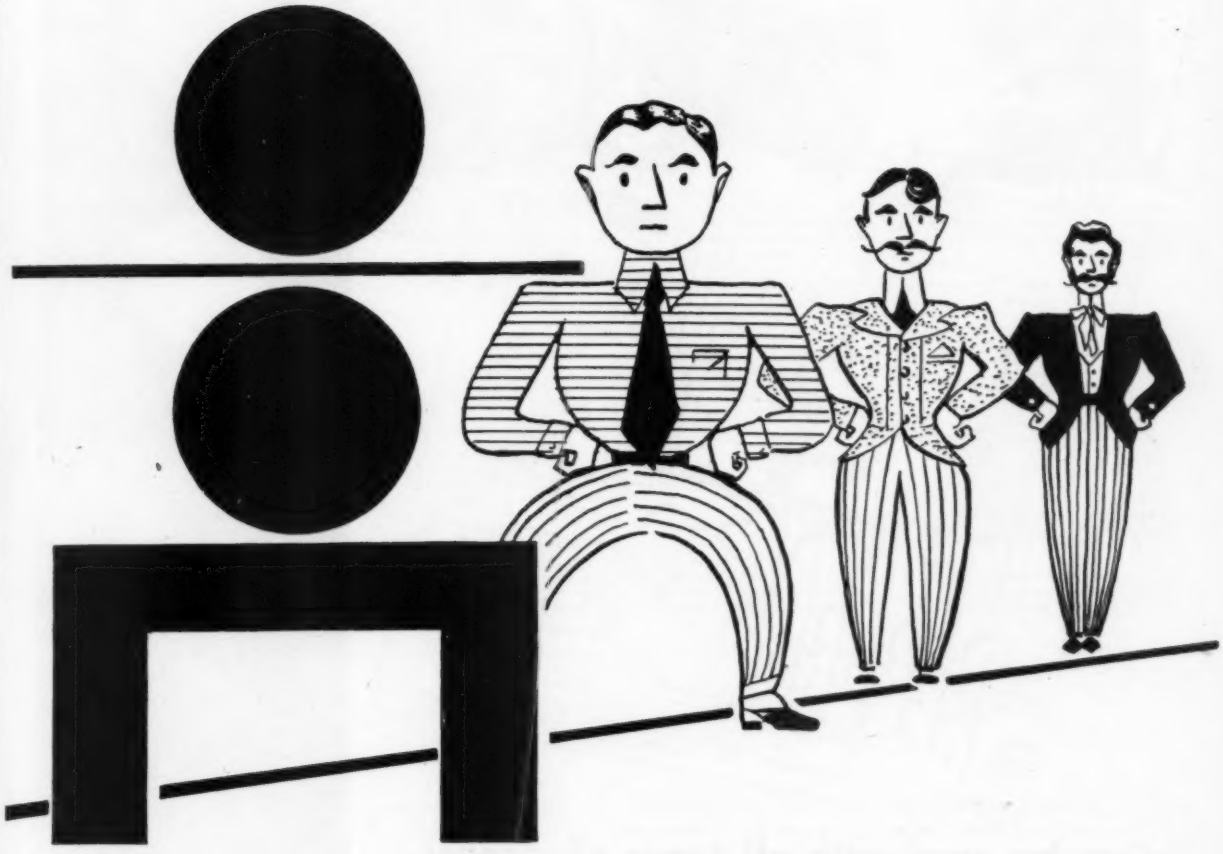
LINK-BELT Pre-Selected Terminals—the right equipment for every requirement



Terminal with single pulley drive | Terminal with screw take-up | Terminal with snubbed pulley drive | Terminal with counterweighted take-up

INTEGRITY

is not old fashioned



INTEGRITY is as much a part of
a Rice Barton paper machine
NOW
as it was in 1837

RB2-53

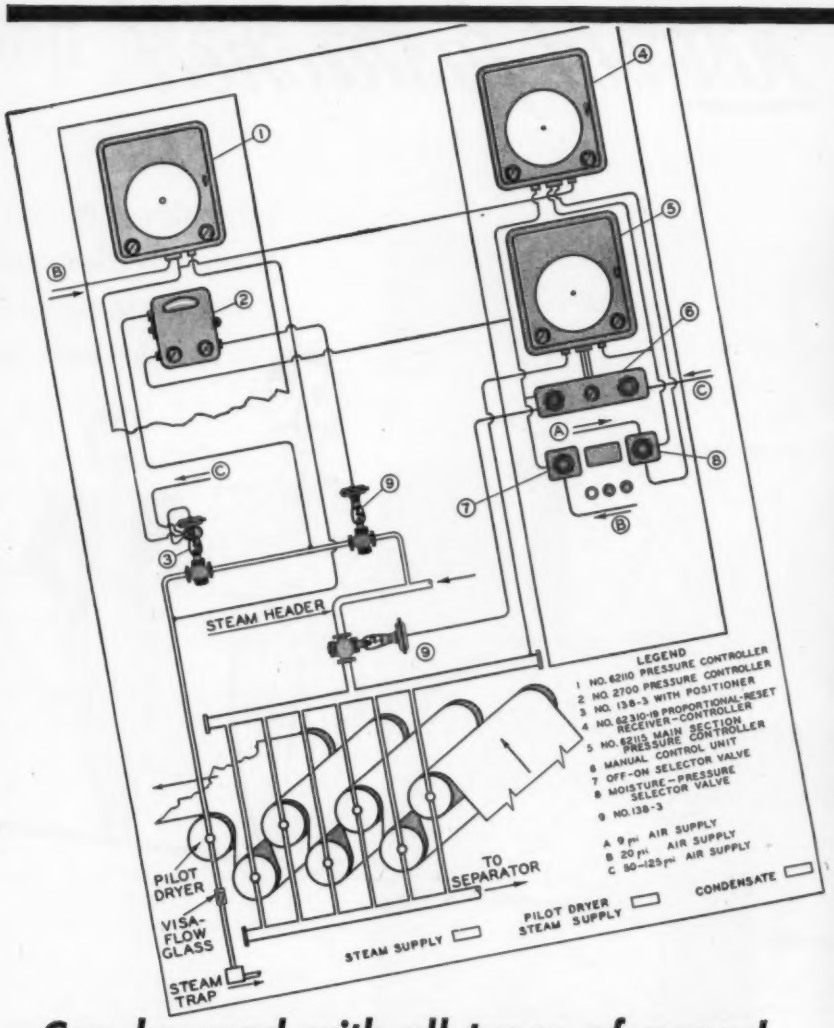
RICE BARTON CORPORATION

Worcester, Massachusetts

Paper Machine Builders Since 1837

West Coast Distributor: Ray Smythe • • 501 Park Building • Portland, Oregon

Versatile NEW MOISTURE CONTROL SYSTEM



Can be used with all types of paper!

Any speed of machine!

Extremely sensitive yet stable, this new Masoneilan Moisture Control System offers many unique advantages for improved paper-making:

Maintains average moisture content across the sheet. Does not rely on 'spot' measurements.

Controls moisture percentage at one or several points along machine.

Can be used for any machine speed — any machine width.

Is suitable for any grade or weight of paper.

Is flexible — system may be applied to one or more sections.

Provides pneumatic individual break control for each control location.

Continuously records operating steam pressures, moisture deviation, time and duration of breaks.

Complete information will be furnished on request.

CONTROLS MOISTURE CONTENT AT . . .

- Breaker Roll
- Single or Multiple Dryer Sections
- Size Tub
- Coating Press
- Reel

MASONEILAN

MASON-NEILAN REGULATOR CO.

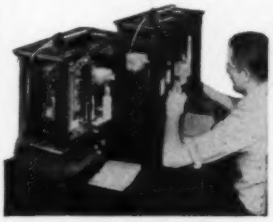
1187 ADAMS STREET, BOSTON 24, MASS., U. S. A.

Sales Offices or Distributors in the Following Cities: New York • Syracuse • Chicago • St. Louis • Tulsa Philadelphia • Houston • Pittsburgh • Atlanta • Cleveland • Cincinnati • Detroit • San Francisco Louisville • Salt Lake City • El Paso • Boise • Albuquerque • Charlotte • Los Angeles • Denver Appleton • Corpus Christi • New Orleans • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

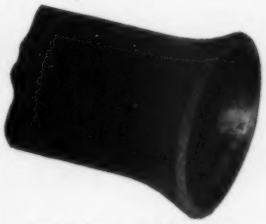
Why guess about evaporator tubes?

The Timken Company shows you what you get

Specifications for 3½% and 5% nickel tubes are available to you with no obligation.



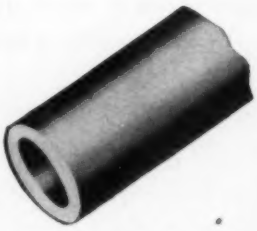
Certified chemical analysis of your shipments are available at your request.



In flaring test, tube I. D. must expand 20% without cracking or showing flaws.

Tubes must have Rockwell hardness number not exceeding B89.

Each tube is tested under hydrostatic pressure of 1,000 p.s.i. before shipping.



Tubes must be free of physical defects and have workmanlike finish. Inspection is rigid.

Tolerances in O. D., wall thickness and cut length are held to a minimum.

Purchaser has free entry to our plant for inspection of work on contract.

. . . and guarantees you'll get it!

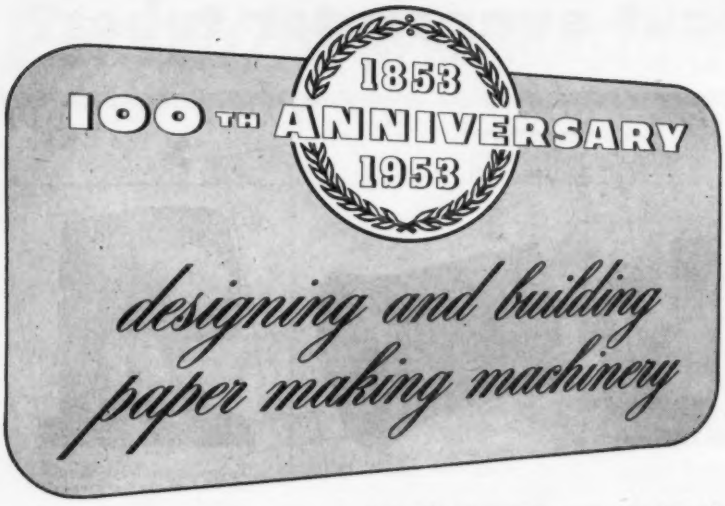
WHEN you buy black liquor evaporator tubes from the Timken Company, you don't have to guess at quality. Timken® 3½% and 5% nickel steel tube specifications let you see exactly what you get. Every essential item is carefully covered—chemical composition, physical properties, inspection methods, plus the strict tests every shipment must pass. (See above).

There's no guesswork on our part, either. The Timken Company guarantees that every order meets these exacting specifications. Quality is controlled at every step. Tubes are tested and inspected before shipment. The result for you is reduced tube replacement costs, less tube sheet wear, less downtime for your plant.

For your copy of 3½% and 5% nickel Timken steel tube specifications, write on your company letterhead to The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



Actually, our company was founded in the spring of 1823 by George Goulding. Being a mechanical genius, he was called upon to build and install all kinds of machinery for the many industries that were rapidly springing up in this country.

The increasing demand of building machinery for the papermaking industry that was rapidly establishing itself in Northern New York, and when more capital and more executive ability was needed, George Goulding formed a partnership of Goulding, Bagley & Sewall in 1853. The new co-partnership prospered and continued to expand.

The continuous production of machinery for the papermaking industry resulted in becoming the principle product of the company. A tribute to the initiative of the company and its employees, was the many new developments in machinery that marked the March of Progress of the papermaking industry. The company built the first Voelter grinder made in the United States—the first spring wet machine to handle the pulp from these grinders —and later, a machine capable of producing paper continuously at 1000 lineal feet per minute.

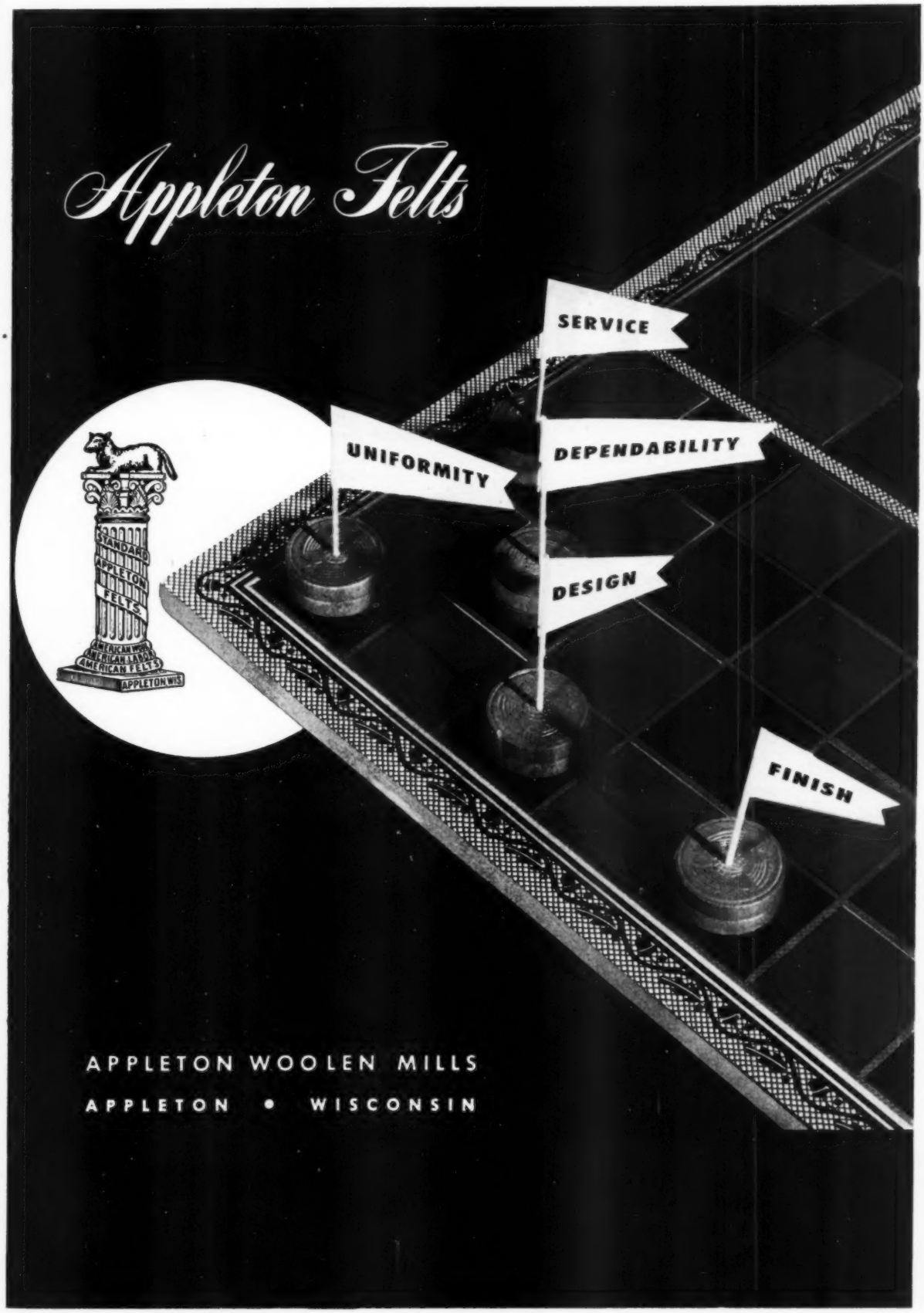
We are justly proud of having been a leader in the March of Progress in the development of the paper industry. So it is in this year of 1953, we celebrate 100 years of service to the paper industry and look forward to the beginning of a second century of continued progressive service.

BAGLEY & SEWALL

WATERTOWN • NEW YORK

Foreign Representative • CASTLE AND OVERTON, Inc., 630 Fifth Avenue, New York 20, N.Y.

Appleton Felts



APPLETON WOOLEN MILLS

APPLETON • WISCONSIN

Merfenel 51*

*PACKED IN ONE AND TWO OUNCE ENVELOPES

A new Product

FOR
SLIME CONTROL
•
MOLD PROOFING
•
PRESERVATION OF
STARCHES AND PROTEINS

R. T. VANDERBILT CO. INC.

230 Park Avenue, New York 17, N. Y.

The Paper Industry

February 1953

Trend Toward Continued Expansion

Indications are that the Canadian $1,200,000,000 pulp and paper industry, which has been riding the crest of spectacular growth during the last seven-year period, will maintain the pace set by the $600,000,000 expansion achieved between 1945 and 1952. In his presidential annual address to the Canadian Pulp & Paper Association, R. M. Fowler estimated that the industry will spend between $80,000,000-$100,000,000 in 1953 on new plant construction and new equipment, although qualifying his prediction by referring to such factors as rising manufacturing costs, high cost of labor, excessively heavy tax burden, and the re-valuation of the Canadian dollar which may adversely influence this preliminary high estimate.

The Canadian pulp and paper industry's trend toward expansion is maintained despite the 3½ per cent decline in 1952 of the overall output, accompanied by a drastic curtailment of exports—especially for pulps. What is more, the trend persists despite the fact that—for the first time in many years—supply has caught up with demand for pulp and paper products.

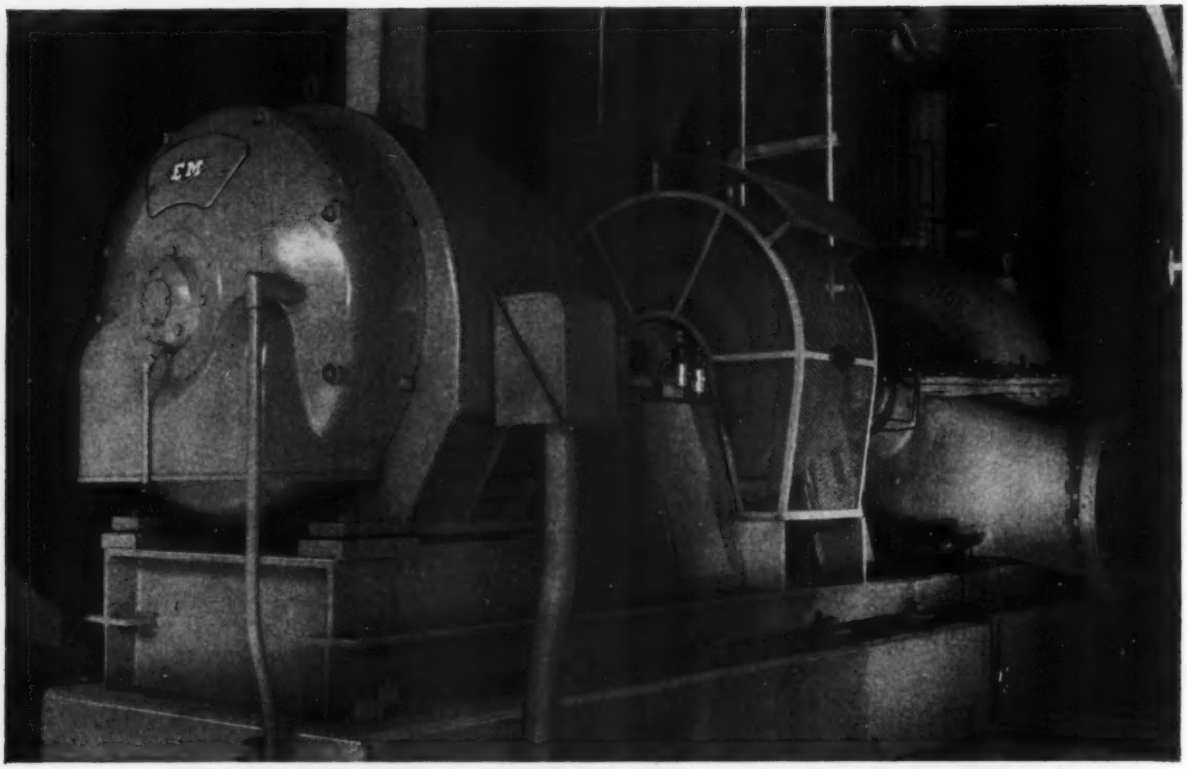
In line with the general trend are the rumors that a $100,000,000 project, including newsprint mill and hydroelectric power development, is being contemplated at Labrador's Grand Falls, Newfoundland, by U. S. and South American publishing interests.

The industry's optimism and justification for continued expansion rests on a sound premise. It stems from the realization that the long-term prospects are good and that the margin between supply and demand is so narrow that a sudden anticipated upsurge of business activity could again tax the industry with demands for pulp and paper products that are far beyond its present production capacity.

An upsurge in production activity, especially in the United States and Canada, is not only likely but predictable in view of the ever increasing dependence of our civilization on paper and paper products.

More than any other single factor, however, which is nourishing this feeling of renewed optimism, is the general awareness that a great nation has acquired a great leader—a combination of circumstances which spells not only survival but also new heights of achievement for the nations of the Free World.

A. W. J. DYCK

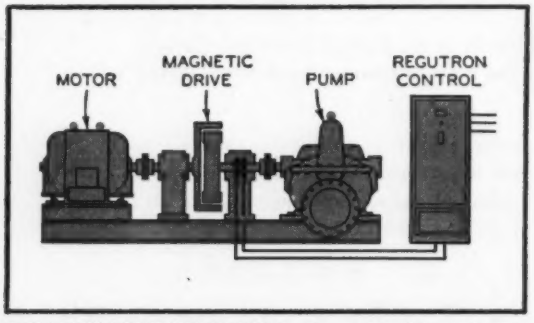


This E-M Magnetic Drive, driven by a 300 hp, 720 rpm E-M Synchronous Motor, provides accurate control of stock handled by a fan pump in the Hollingsworth & Whitney Company's Mills at Mobile, Alabama.

How to keep fan pump speed constant

To manufacture uniform paper, the spouting velocity of the stock in the headbox must match the speed of the screen. However, headbox spouting velocity, which is dependent upon fan pump output, may be materially affected by inconstant pump motor speed, caused by nominal voltage and frequency variations.

Precise control of fan pump speed is achieved most practically and efficiently by an E-M Adjustable-Speed Magnetic Drive and "Regutron" Speed Control. This is because the E-M Magnetic Drive acts as a "speed compensator" between the a-c drive motor and fan pump. The paper machine operator can select fan pump speed by adjusting a small speed control potentiometer mounted near the paper machine . . . and the "Regutron" Speed Control automatically holds the fan pump at the desired speed.



E-M MAGNETIC DRIVE SYSTEM for Pump Speed Control—This system consists of a constant-speed motor, the Magnetic Drive, and the "Regutron" Speed Control. Operating speed of the "magnet" coupled to the pump shaft is held at the desired value by the "Regutron" which supplies d-c excitation to the "magnet" in accordance with the setting of the pump speed selector.

Let this precise, adjustable speed control help you maintain constant fan pump speed in your mill. For complete information on E-M Magnetic Drives and their mill applications, call your nearest E-M sales engineer. Or, write the factory for Publication No. 1107 (on E-M Magnetic Drives and "Regutron" Speed Controls) and E-M Synchronizer No. 33 (a special issue on pumps and pump drives).

ELECTRIC MACHINERY MFG. COMPANY
MINNEAPOLIS 13, MINNESOTA

4400-TPA-2124

Specialists in
BIG MOTOR ENGINEERING

The Paper Industry Current Comment

Outlook improving . . . the Connecticut Valley . . . and national policy

Business prophets have created a boom market in crystal balls since the outcome of the 1952 elections, and one more estimate of the nation's business future would be quite useless. Whatever the future, however, there is one forecast with which this writer, like most others, cannot fail to agree, and that is for an improved business outlook and better economic incentives than have existed for some years.

When this publication reaches its readers, there will have been a flood of proposed legislation that would affect future business operations. Some proposals have already begun to appear, such as one from the chairman of the potent Ways and Means Committee of the House of Representatives proposing an early reduction in taxes. Over-optimism as to immediate legislation to remove business handicaps, however, should be discounted. As Rome was not built in a day, so a huge national deficit cannot be wiped out over night. Budget-making, curtailment of waste—all must come before any actual steps can be taken to cut government income to meet a reduced outgo, much of which is already mortgaged by appropriations of the past.

Excess Profits

Students of business economy, however, can look forward with some modicum of hope to the elimination of excess profit taxes. The present excess profits tax law is due to expire June 30, and there is real hope in business and legislative circles that it will not be renewed. Some financial houses are already beginning to point to the effect of such a change on the prospects of important paper manufacturing companies. One such writer has said that the collection of these taxes has to a large extent concealed the real advance in business that many companies, both large and small, have accomplished. Reduced earnings have been due to heavy tax pressure, while sales have continued at high levels.

As the year ended it became apparent that the production of paper and paperboard in 1952 would reach very close to the record output of 1951. Paper mills operated during the year at an average of just under 90 per cent of capacity—as compared with 98 per cent in 1951, and the average was brought down by the 20 per cent slump in paperboard production during the first half of the year. Even so, board output for the year reached an average comparable to that of the paper mills.

Except for the psychological effect, the 30 per cent cut in Scandinavian pulp and paper prices had little impact on domestic markets. Demand at home made it unnecessary for domestic mills to cut prices to meet low priced foreign offerings, even when these quotations were below the cost of production in this country. Reduced prices for Scandinavian pulp helped domestic converting mills hold down their production costs.

Valley Authorities

The issue of a series of "Little T.V.A.'s" has already reached the new Congress in two radically different types of bills. One is to establish a Missouri River system for the production of power, flood prevention and other benefits to that region, and was introduced by a Minnesota Democrat. On the other hand, a bill introduced by a California Republican would require that the people of an area to be affected be called upon to approve such a valley authority before any such water control system could be established. An important area which is watching this type of proposal most carefully is the Connecticut Valley, with its great number of paper mills dependent on that stream and its tributaries for power and clean water with which to operate their plants.

In the welter of problems to come before the new Administration are many of vital importance, involving national policy. Among such questions are the position to be taken by the United States on foreign aid for the battle against Communism, what to do about the war in Korea; and, closer to home, the battle against corruption in government departments, Communist infiltration into the nation's executive and educational channels, modification of labor legislation, cutting of waste in government, reduction of excess costs for defense purposes, and a host of other unrelated problems.

To say that these problems form a kaleidoscope of future history is putting it mildly. One thing is certain, however, and that is that the new Administration will take a firmer stand against Communist encroachments from Russia and allied sources than has recently been the case. The inaugural address of President Eisenhower in guarded, yet firm, tones made this plentifully evident.

Financial Reports

The "Eisenhower boom" in the stock market reached its peak during January, when security market averages reached the highest figure since the pre-depression days of the 1930's. A recession, which may be only temporary, naturally followed the maintained increase in securities quotations.

Net incomes

British Columbia Forest Products Ltd.—Net profit of $1,175,094 for the year ended September 30, 1952, was 56.6 per cent less than the previous year's net of $2,709,763.

Celotex Corp.—Net income for 1952 was $52,032,189, as compared with $59,241,634 in 1951.

Central Paper Co.—Net deficit for three months ended September 30, 1952, was $172,383, as compared with a profit of $170,034 for the same period in 1951.

MacMillan & Bloedel Ltd.—Net profit in the year ended September 30, 1952, was $13,818,340, off about a third from the combined earnings of the

two predecessor companies during 1951.

Marathon Corp.—Net income for the fiscal year ended October 31, 1952, was $7,073,558, a drop of 19.6 per cent from the net for the previous fiscal year, though net sales were only 5.6 per cent below those of the previous year. Net income for the previous year was $8,801,001.

Masonite Corp.—Net profit for three months ended November 30, 1952, was $848,010, as compared with $926,984 for the same period in 1951.

Nekoosa-Edwards Paper Co.—Net income for the first nine months of 1952 was $1,370,000, as compared with $1,441,000 for the same period in 1951.

Oswego Falls Corp.—Net income for the year ended December 31 was $1,152,655, as compared with $1,154,178 in 1951.

Rayonier Inc.—Net income in 1952 was $10,985,000, as compared with $11,024,000 in 1951.

Rising Paper Co.—Net income for the year ended November 2, 1952, was $181,701, as against $263,294 for the previous fiscal year.

Strathmore Paper Co.—Net profit for 1952 was $311,213, as compared with $347,899 in 1951.

West Virginia Pulp & Paper Co.—Net profit for 1952 was $9,471,000, as compared with $10,326,000 in 1951.

Dividend declarations

Atlanta Paper Co. has declared a stock dividend of 10 per cent on the common, payable to holders of record December 20.

Crystal Tissue Co. has declared a regular quarterly dividend of 15 cents a share, payable December 30 to stock of record December 20.

Gair (Robert) Co. Inc. has declared a quarterly dividend of 37½ cents per common share, payable March 10 to record of February 20.

Marathon Corp. has declared a quarterly common dividend of 30 cents a share, payable February 28 to holders of record of February 10; also a preferred dividend of $1.25 per share, payable April 1 to record of March 20.

Mead Corp., The, has declared a quarterly dividend of 40 cents per share on the common and the regular quarterly of $1.0625 per share on the 4¼ per cent cumulative preferred, both payable March 1 to stock of record February 3.

National Container Corp. has declared a quarterly cash dividend of 15 cents per common share and a stock dividend of one common for every 100 common held; also, the regular quarterly dividend of 31¼ cents per share on the $1.25 convertible preferred; both the common and preferred dividends are payable March 10 to record of February 20.

Stone Container Corp. has declared a dividend of 20 cents per share on the

Hot water for pulp washing

uncontaminated . . . at the desired temperature

Recover heat from steam released in the digester blow tank with a Swenson Surface Condenser! Its operation is automatic and synchronized with blowing cycles. You'll get *clean* hot water at the desired temperature for pulp washing.

Let a Swenson Engineer help you arrange a condenser system to meet your specific needs!

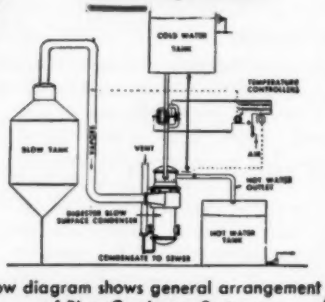
SWENSON EVAPORATOR COMPANY
15653 Lathrop Ave., Harvey, Illinois
Pulp Washers • Evaporators • Filters
• Digester Blow, Surface and Turpentine Condensers

SWENSON
Proved Engineering for the Process Industries
SINCE 1889

A Division of WHITING Corporation

TALK WITH A SWENSON ENGINEER

HE WILL RECOMMEND THE RIGHT EQUIPMENT



Flow diagram shows general arrangement of Blow Condenser System

New Weyerhaeuser Machine, designed for the manufacture of bleached kraft papers over a wide weight range, was a major element in the recent expansion program at the company's Longview, Washington mill. The machine incorporates all latest features to assure versatility at high production rates. It was engineered and built by Beloit Iron Works, Beloit, Wisconsin.

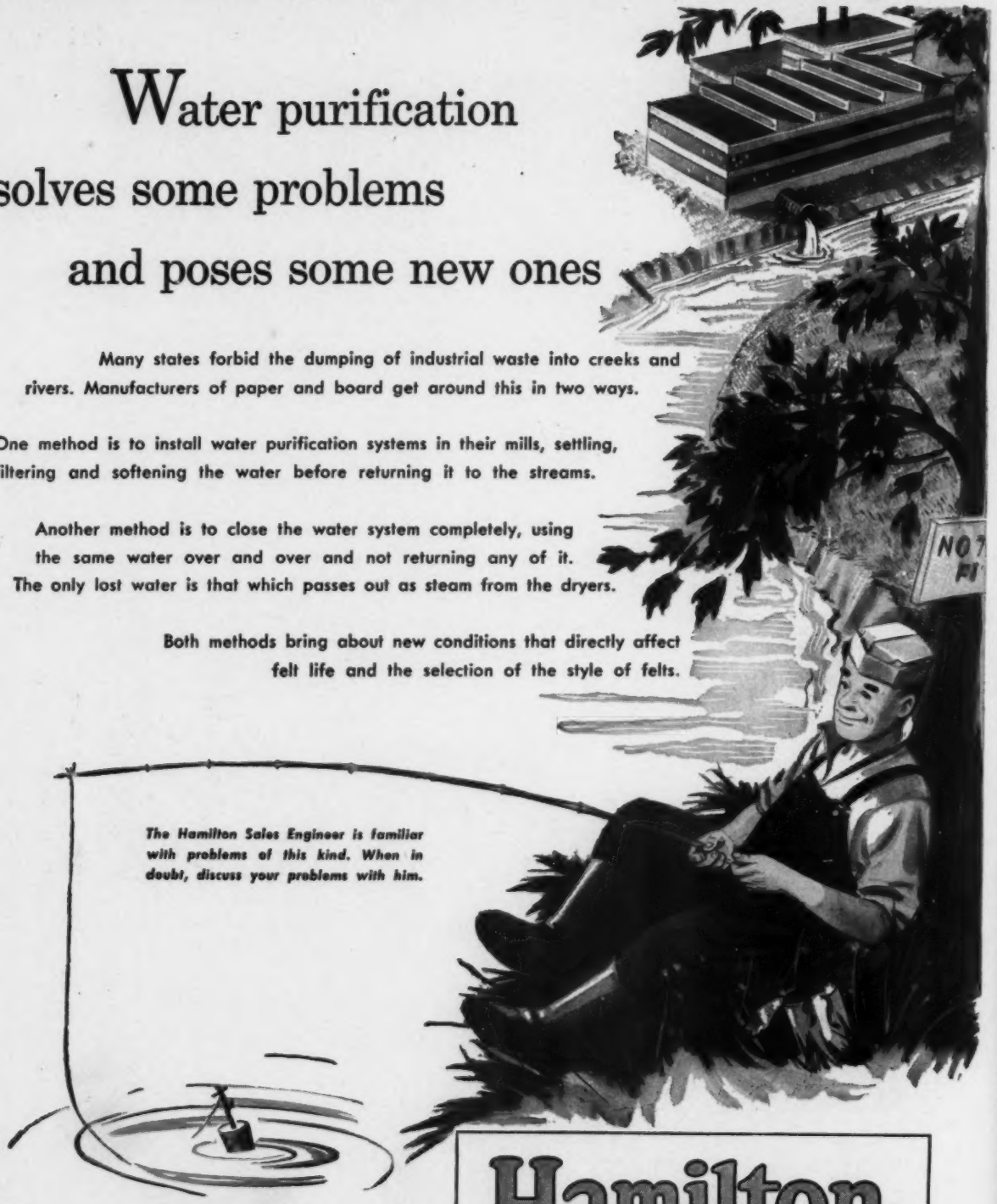
Water purification solves some problems and poses some new ones

Many states forbid the dumping of industrial waste into creeks and rivers. Manufacturers of paper and board get around this in two ways.

One method is to install water purification systems in their mills, settling, filtering and softening the water before returning it to the streams.

Another method is to close the water system completely, using the same water over and over and not returning any of it. The only lost water is that which passes out as steam from the dryers.

Both methods bring about new conditions that directly affect felt life and the selection of the style of felts.



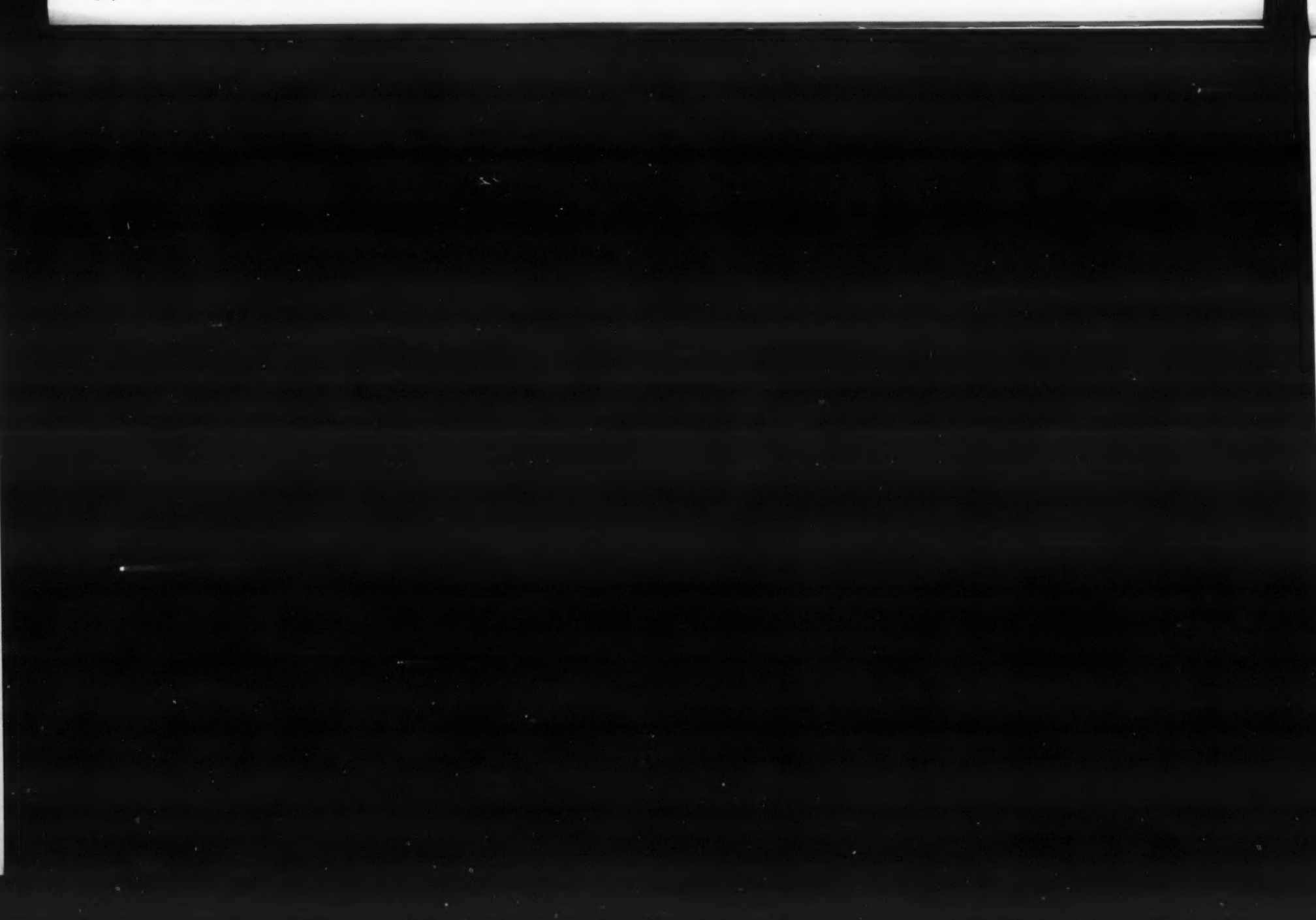
The Hamilton Sales Engineer is familiar with problems of this kind. When in doubt, discuss your problems with him.

MIAMI WOOLEN MILLS

Established 1858

Hamilton Felts

SHULER & BENNINGHOFEN, HAMILTON, OHIO



common, payable January 19 to record of January 9.

Paper mill corporate changes

American Tissue Mills, operating under a trusteeship, has announced changes in the personnel of the trustees, with Homer Sinclair—formerly of Ben-Mont Paper Co., Bennington, Vt.—having a principal role in the operation of the firm. James Y. Scott of Springfield, Mass., formerly a trustee, will continue in an advisory role; he was an important figure in the financing of the new corporate set-up.

Berkshire Paper Converting Co. has been sold at public auction for a net of $33,500, several buyers sharing in the purchase of property and equipment.

East Texas Pulp & Paper Co., jointly owned by Houston Oil Co. and Time Inc., has financed its construction program, scheduled to begin in April, through negotiations with Northwestern Mutual Life Insurance Co. and the Chase National Bank of New York, N.Y.

Kimberly-Clark Corp. has announced that Blyth & Co. Inc. is making a secondary distribution of 19,800 shares of K-C common at 47½; the New York Stock Exchange has approved member participation.

Stock and Bond Quotations

New York Stock Exchange—Stocks

	Closing Prices Jan. 20, 1953	Dec. 19, 1952
A.P.W. Products	* 5 – 5¼	5⅝
Celotex	17⅞	17⅞
Same Preferred	16¾	16⅞
Certain-Teed Products	14⅞	14½
Champion P&F Co.	37	29½
Same Preferred	*101 –102	101½
Chesapeake Corp.	* 30 – 30¼	30
Continental Diamond	12½	11⅞
Container Corp.	41⅛	41⅝
Same Preferred	*101⅝–103½	*102½–103¾
Crown Zellerbach	63	64¾
Same Preferred	*101⅜–103	102⅝
Dixie Cup	36⅝	38
Eastern Corp.	17	17¼
Robert Gair	20	19⅛
Gaylord Container	26⅝	26½
Hammermill	16	15⅝
International Paper	54⅜	54
Same Preferred	*100⅝–102½	101¼
Kimberly-Clark	45⅝	48
Mac Andrews & Forbes	44	42½
Marathon	23¼	23½
Masonite	24	24⅝
Mead Corp.	27	24⅝
Same Preferred	* 92½– 93	90
National Container	11⅝	10⅝
Rayonier, Inc.	33⅛	36⅝
Same Preferred	34⅝	33⅞
Scott Paper	55¼	58¼
Same 3.40 Preferred	* 88 – 85⅝	92¼
Same $4 Preferred	*103½–105	104
St. Regis Paper	19½	20¼
Same Preferred	* 93 – 94	92
Sutherland Paper	26	25½
Same Preferred	*105⅜–107	110⅜
Union Bag & Paper	48⅜	46⅞
United Board & Carton	14⅞	14
United Wall Paper	3½	3¼
Same Preferred	25⅝	*25¼– 27
U.S. Gypsum	119	117
Same Preferred	*172 –174	174
West Virginia P&P	* 78– 79⅝	80⅝
Same Preferred	*108 –108½	108⅝

New York Stock Exchange—Bonds

Celotex 3½%	.....	.....
Champion P&F Co. 3%	99½	110
Mead Corp. 3%	.....	.....

American Stock Exchange—Stocks (Formerly Curb Exchange)

Am. Writing	2⅝	2½
Brown Co.	10¼	10
Brown Co. $5 Preferred	99¼	.....
Same Preferred $3	48½	48⅝
Great Northern Paper	55½	53⅝
Puget Sound	29½	28⅝

*Closing Bid and Asked Prices

AT YOUR SERVICE 2 NEW Shenango bulletins

. . . on symmetrical or annular parts, ferrous and non-ferrous

IF your plans call for bushings, liners, sleeves, rings, rolls, or *any* essentially symmetrical shape, find out about the many advantages you stand to gain with Shenango centrifugally cast parts.

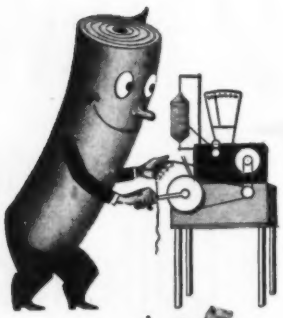
BULLETIN NO. 150 covers nonferrous parts in manganese and aluminum bronzes, red bronzes, brass, Monel Metal and special alloys.

BULLETIN NO. 151 covers parts of Meehanite Metal, Ni-Resist and special iron alloys.

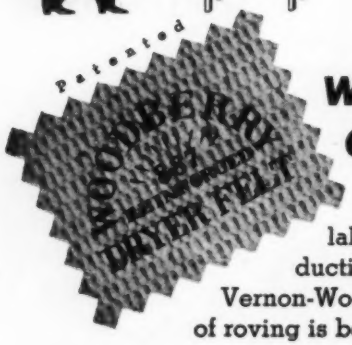
These new bulletins show typical Shenango produced parts that are saving time, trouble and cost in industries everywhere. Get the facts. Either or both bulletins are yours for the asking.

SHENANGO-PENN MOLD COMPANY
Centrifugal Castings Division
Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO
ALL RED BRONZES · MANGANESE BRONZES · ALUMINUM BRONZES
MONEL METAL · NI-RESIST · MEEHANITE® METAL

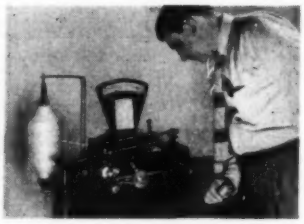


SCIENTIFIC CONSTRUCTION
Makes the Big Difference In DRYER FELTS



WOODBERRY 887 Reinforced Dryer Felt Gives You Scientific Construction*

One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. Here evenness of roving is being checked with Belger Tester.



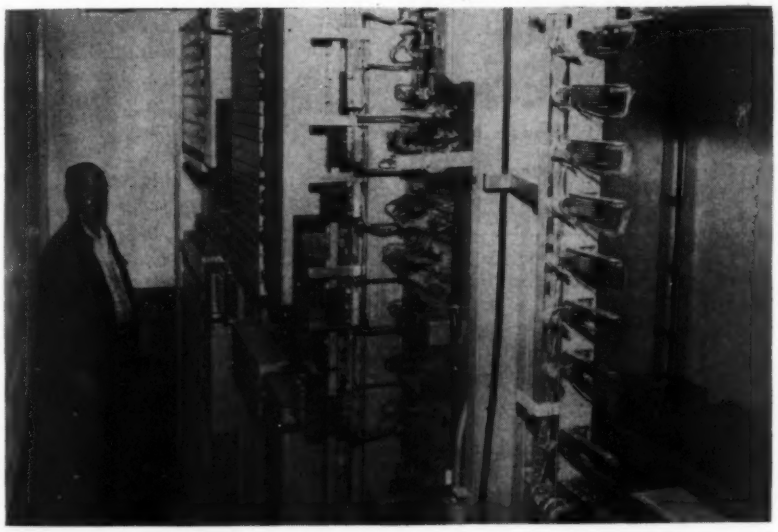
**Asbestos yarns woven into the face of Woodberry 887. Clipper Seams if desired.*

Mt. Vernon-Woodberry Mills

Branch Offices: Chicago • Atlanta • Baltimore • Boston • Los Angeles

TURNER HALSEY COMPANY
Selling Agents
40 WORTH ST NEW YORK

The Paper Industry News of the Industry



COMPLETELY AUTOMATIC private branch exchange recently installed at the Camas, Wash., plant of Crown Zellerbach Corp.; checking the equipment is Dick Huycke, stationman for West Coast Telephone Co.; the PBAX is located in the basement beneath the main mill office

Dial 'Phone System Results in Increased Efficiency at Camas

INSTANT, ACCURATE communication between the various parts of the Crown Zellerbach Corp. mill at Camas, Wash., has resulted from the installation of a completely automatic dial telephone system. Converted from manual operation at a cost of nearly $60,000, the plant's intercommunication service now operates at "a flick of the index finger."

Center of the system is a huge "mechanical brain" located in the basement below the front office. Correct stations are selected by "ever-accurate steel fingers unhampered by human failings." An operator has been retained, but her only task is to relay calls to "the outside."

The equipment is a development of Stromberg-Carlson and, according to an official of West Coast Telephone Co., "does everything but send out the telephone bill." The complex PBAX (private branch automatic exchange) cost more than $40,000, with the remainder representing cost of installation of the miles of wire necessary. Today there are about 250 telephones in the mill, with each instrument serving an average of four persons. All equipment is the property of the telephone company, which sells the service to the mill.

Benefits brought about by the automatic system are said to be 24-hour service on every 'phone and increased efficiency by the present 48-volt system, as compared to the 24 volts before the conversion. Power for the mill telephone service is supplied by a row of storage batteries representing 23 cells.

Bagasse to Be Raw Material in New Louisiana Mill

Manufacture of newsprint and types of cellulose pulp from bagasse is planned for a mill at Lockport, La. According to a report from the NPA in Washington, D.C., an application for accelerated depreciation was filed recently by William J. Amoss on behalf of Valentine Pulp & Paper Co., which is a partnership of Valite Corp. and Brown & Root of Houston, Texas.

Data filed with NPA shows that the projected plant will have an annual capacity of 17,250 tons of finished paper and pulp products. It will employ approximately 70 persons and will have a gross value of products of $3,000,000.

NPA officials were told that 500,000 tons of bagasse are burned in Louisiana each year despite the fact that it is inferior fuel. While the proposed plant would be able to use only about 36,000 tons of the sugar cane residue annually, the success of the operation would pave the way for expansion and the establishment of other plants. The process to be used is a new one on which Valite has been working since 1939. According to Mr. Amoss, construction work is to begin as soon as NPA approval is granted.

Marathon-Northern Merger Being Completed

Marathon Corp. of Menasha, Wis., and Northern Paper Mills, Green Bay, have announced that arrangements are being completed to merge Northern's interests into Marathon.

News that the transaction was in progress came from the presidents of the two firms: Marathon's John Stevens Jr. and Northern's Milan Boex. The action, being taken on the recommendation of the directors of both firms, is subject to formal approval by Northern stockholders.

The merger of the two companies amounts to a consolidation of interests by two organizations which between them reported sales of more than $107,000,000 during 1952. Marathon revenue, derived principally from sale of packaging for the food industry and paper products for the consumer, exceeded $86,000,000; while sales for Northern,

NEWS HIGHLIGHTS

Camas Installs 'Phone System....1319
Marathon-Hoberg Merger 1319
$20,000,000 N. Z. Project.....1321
Anti-Pollution Progress 1324
Newsprint Demand to be Met by Production 1327
Japan Eyes Alaskan Timber.....1331
Expanded Research in Insect and Disease Control.....1332
Sulfur Optimism Unwarranted..1337
Production Report 1342

EXCAVATING FOR the main building footers at the new Rome Kraft Co. sulfite board mill in Rome, Ga.; contractor for the job is Maxon Construction Co. of Dayton, Ohio, using a 1-yard Lorain hoe for digging footings, equipment foundations, water treatment plant and trenching for effluent lines, water lines, and sewer lines

a specialist in the retail product line, were more than $21,000,000.

The transaction involves a tax-free exchange of stock, and no cash will be involved, Mr. Boex declared. The Northern trade name will be retained.

Already a multi-plant operation with holdings in eight locations in the United States and Canada, Marathon will fit Northern's complete facilities into its over-all manufacturing, marketing, and research program.

Northern operates completely integrated facilities for the production of pulp, paper, and finished consumer products at Green Bay and has timber holdings in Michigan and Ontario. Marathon operations, prior to the merger, include plants in Menasha, Rothschild, Wausau and Ashland, Wis.; Menominee, Mich.; Oswego, N.Y., a wholly-owned subsidiary at Sunnyside, Wash., and the Canadian subsidiary, comprising a pulp mill, a chemical plant, and 5,000 square miles of timber concessions in central Ontario.

Potlatch Expansion Progresses

Work is progressing rapidly toward the completion of additional units at the pulp and paper mill of Potlatch Forests Inc., Lewiston, Idaho. The project will increase the daily capacity from 160 to 325 tons.

A 200-foot building extension is being added to the paper mill, while the installation of 29 additional drying rolls had been nearly completed in mid-January. Four additional calender dryers were being installed at that time.

Nearing completion was a second lime kiln at the pulp mill. Four new digesters, each with a capacity of 4,000 cu. ft., were being connected. A new effluent pipeline was being surveyed. The line will carry pulp waste for a distance of two miles to the confluence of the Snake and Clearwater rivers.

St. Regis Puts Jacksonville Mill in Operation

Raising its annual kraft paper and board capacity to 560,000 tons, St. Regis Paper Co. has put its new 100-ton pulp, paper and board mill at Jacksonville, Fla., into operation.

The new operation, located on a 200-acre site on the tidewater at Eastport—on the outskirts of Jacksonville—is served by the Seaboard and Atlantic Coast Line railroads. Its output is to be used principally for supplying kraft paper and board to the firm's contract customers. It has been designed and equipped with key facilities, in adequate size, so that it can be enlarged if long-term trends require expansion.

Marathon Completes Chemical Division Expansion

Marathon Corp. has announced the completion of a two-year $500,000 expansion program at its Chemical Division plant at Rothschild, Wis. Thirteen large process tanks and four major pieces of equipment have been added to existing facilities. The net effect of the expansion will be to raise monthly production by 1,250,000 pounds of lignosulfonate powders, bringing the firm's total output to 3,250,000 pounds of powders and nearly 3,000,000 pounds of solids as liquid products per month.

Putting the new facilities into operation involved the problem of an adequate basic raw material supply. The lignosulfonates that Marathon had manufactured to date were derived from the sulfite effluent liquor of the firm's Rothschild pulp mill. Now, to fully utilize its new production facilities, the Chemical Division has arranged to buy additional quantities of sulfite liquor from another mill. The applications for Marathon lignosulfonates run from adhesives to vanillin and include such uses as boiler water treatment, insecticides, leather tanning, oil well drilling, and the black masterbatching of rubber.

To date, Marathon has spent better than $1,750,000 on its chemical plant and equipment, as well as more than $2,000,000 on research to make useful products from the waste liquor. The Chemical Division operated continuously in the red until 1945, when for the first time the profit picture could be expressed in black ink. For the past two years the complete productive capacity has been sold out, and with the new improved plant facilities it is expected that the division's gross sales will have increased by 50 per cent within the next 12 months.

Nepco, Mosinee Increase Timber Holdings

Nekoosa-Edwards Paper Co. and Mosinee Paper Mills Co. have each announced 50 per cent ownership of Tomahawk Timber Co. The Wisconsin firms had each held 45 per cent of the timber company, while National Container Corp. owned the remaining 10 per cent. Negotiations were recently completed for the sale of National Container's interest, with Nepco and Mosinee each acquiring 5 per cent.

Tomahawk Timber is an operating company holding agreements with the federal government for logging operations in the Superior National Forest in northern Minnesota. This timber area will in the future furnish a large part of the spruce requirements of both Nepco and Mosinee at favorable freight rates.

The logging operations carried on by Tomahawk are headquartered at Forest Center, Minn. Annual output of the timber firm is between 80,000 and 100,000 cords.

National Container Begins Georgia Construction

Steel work has been started on the $25,000,000 pulp, paper and board mill that National Container Corp. has under construction near Valdosta, Ga. Work is to be completed before the end of 1953.

Increasing National's capacity by 50 per cent, the new mill will supply the firm's 14 box plants. Several millions of dollars have already been spent in clearing and preparing the 250-acre site.

Everett P & P Converts Bleach Plant

Everett Pulp & Paper Co., Everett, Wash., has converted its bleach plant from the batch method into a continuous system. The new system is designed to deliver to the paper mill about 675,000 gal. of stock daily in slush form.

Under the former batch method, the

plant bleached its cottonwood and fir pulp independently. Now, there is no break in the flow of pulp. The effect of the change is the production of more uniformly bleached pulp, according to Jack Smith, pulp superintendent.

Expansion Notes

Consolidated Water Power & Paper Co.'s
Interlake Division at Appleton, Wis., has constructed a $35,000 addition to its plant for loading and unloading wood. The 40 by 100-ft. jammer shed, 20 ft. high, is aluminum and houses two giant diesel cranes. Part of the structure is utilized as a repair shop.

Wisconsin Tissue Mills,
Menasha, Wis., has constructed a warehouse of more than 6,600 sq. ft. on its property. The building is the firm's sixth warehouse. Cost of the structure was not disclosed.

Diversification Noted as Factor in Industry Growth

"Diversification of paper usage into such fields as frozen foods, handkerchiefs, towels, cups and milk bottles has been chiefly responsible for the dollar sales growth of 19 leading companies from less than $500,000 in 1936 to more than two billion dollars last year—a five-fold increase." This was the view expressed in January by Charles M. Werly, trustee of the Putnam Fund and partner in Putnam Management Co. Speaking on a New York, N.Y., radio program, Mr. Werly declared that paper's expanded applications "have resulted in an increase of per capita consumption from about 150 pounds in 1932 to more than 400 pounds in 1951."

Defining over-expansion as one of the industry's early problems, Mr. Werly said that "this condition has been rectified to a large extent, and as a result there has been a great geographical shifting around within the paper industry." He explained that the newsprint industry has shifted from New England to Canada, whereas the kraft paper and container board branches have gone south. "Most paper companies," he continued, "make it a policy not to cut trees any faster than they can be replaced, with replacement growth taking place at a much faster rate in the South."

The Putnam representative pointed out that the earnings of the 19 representative firms have increased $172,000,000 during the past 15 years. He said that the industry's outlook is good and will be even better if the excess profits tax is allowed to expire. "Practically all units in the industry, even the marginal producers," he concluded, "reported record or near-record profits in 1951."

Canada Leads World in Pulp Export

Canada, in addition to being the world's leading producer of newsprint, has recently become its largest exporter of wood pulps, supplying more than 1,800,000 yearly tons to the United States alone.

Export of pulp and paper by Canada last year was close to one billion dollars in value and accounted for about 23 per cent of total exports. Pulp and paper exports to the United States, it has been estimated, earned about 35 cents of every U.S. trading dollar obtained by the Dominion in 1952.

MacMillan & Bloedel to Double Pulp Facilities

The Harmac Pulp Division of MacMillan & Bloedel Ltd., Nanaimo, B.C., plans to double its size and capacity. The project, which is to be completed late this year, will cost approximately $20,000,000.

The Harmac mill, which opened in 1950, was the second in Canada designed to utilize residue wood for raw materials. The first was the Alberni Pulp Division, opened in 1947 by the then Bloedel, Stewart & Welch Ltd. The Harmac mill produces bleached sulfate pulp, while production at Alberni comprises unbleached sulfate pulp.

At present, output at Harmac is a daily 270 tons. The proposed expansion will bring the daily capacity to 600 tons. Several buildings were nearing completion early in January, and equipment was being installed.

B. C. Industrial Future Hinges on Forests

Predictions for the industrial future of British Columbia are bright. Current investment is primarily in the development of natural resources. The forest industry has been called a "throbbing pulse," particularly in the central interior, where large mills are being constructed.

Industrial experts in the area have noted that expansion is moving away from the southern manufacturing belt, with the central area of the province leading in recent developments. Among these have been the opening of the Western Plywoods plant, the opening of a mill near Prince Rupert for the manufacture of acetate dissolving pulp, while Vancouver Island, too, has come suddenly into active expansion.

Utilization

Prosperity has come to the people of Quensel and Prince George and surrounding areas, where once much apparent waste resulted because the economics of the region made it impossible to produce pulp and paper products. Now, through integration in the forest industries, people are looking forward to greater utilization. The next step in central B.C. will probably be the establishment of a pulp mill that will utilize much of what is now waste. The first such mill in the area will provide a solid basis for the entire industry.

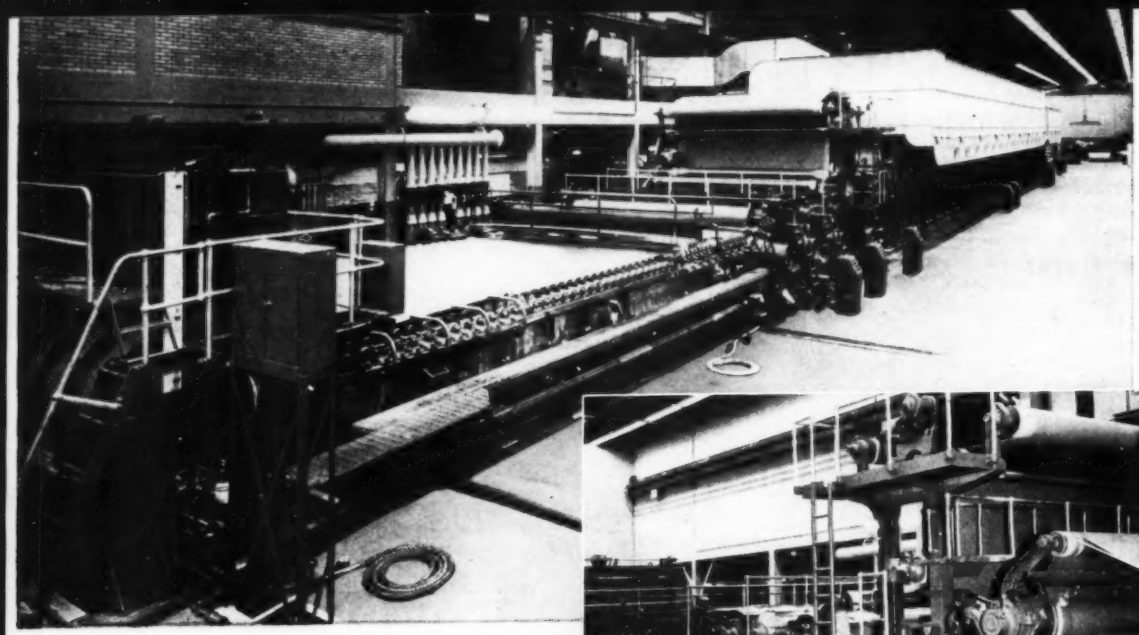
FOREST UTILIZATION PROJECT of N. Z. Forest Products Ltd., showing the pulp and paper mills under construction at the right; airstrip is at upper left

Forest Utilization Key to $20,000,000 N. Z. Project

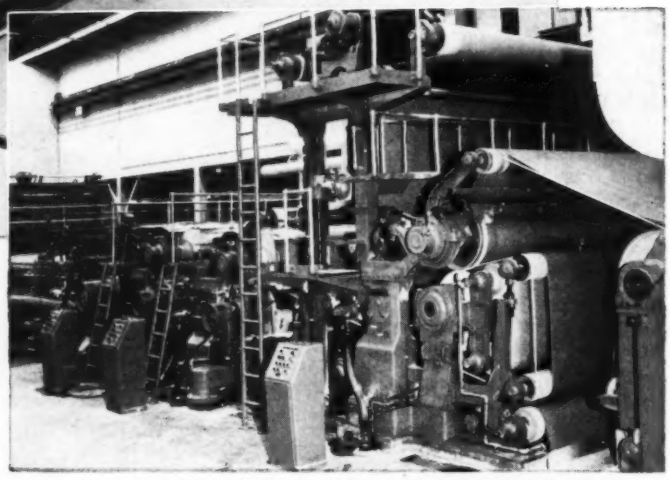
The largest forest utilization project of its kind in the Southern Hemisphere is nearing completion at Kinleith, 144 miles south of Auckland, New Zealand. N. Z. Forest Products Ltd. has invested about £7,000,000 (nearly $20,000,000) in the enterprise, which is situated at the center of the company's 176,000 acres of Monterey pine.

The firm plans to produce a maximum of 45,000 tons of unbleached sulfate pulp annually, 12,500 tons of which has already been earmarked for export to Australia for newsprint furnish. Kraft paper production will be a yearly 25,000 tons. The kraft will be used principally for making Bates multiwall bags and fiber containers at N. Z. Forest Products' Auckland plants.

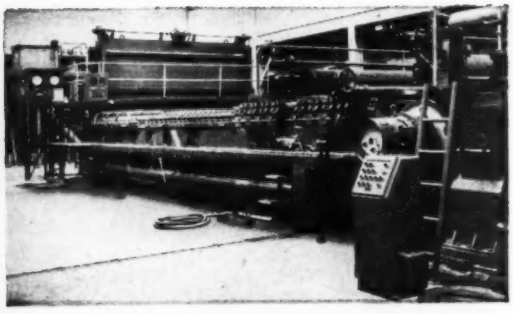
Average daily output of sawn timber



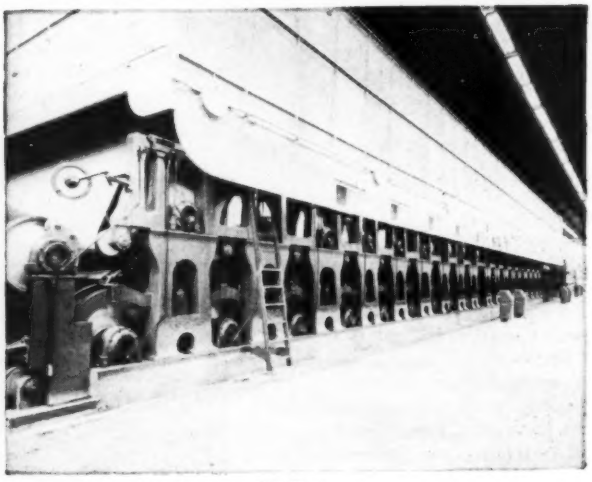
View from Wet End.



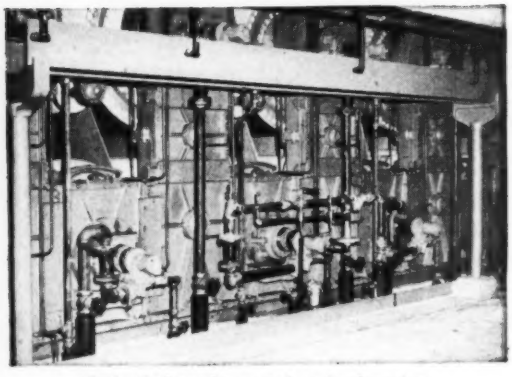
Press Part with two Suction Presses and reversed third press.



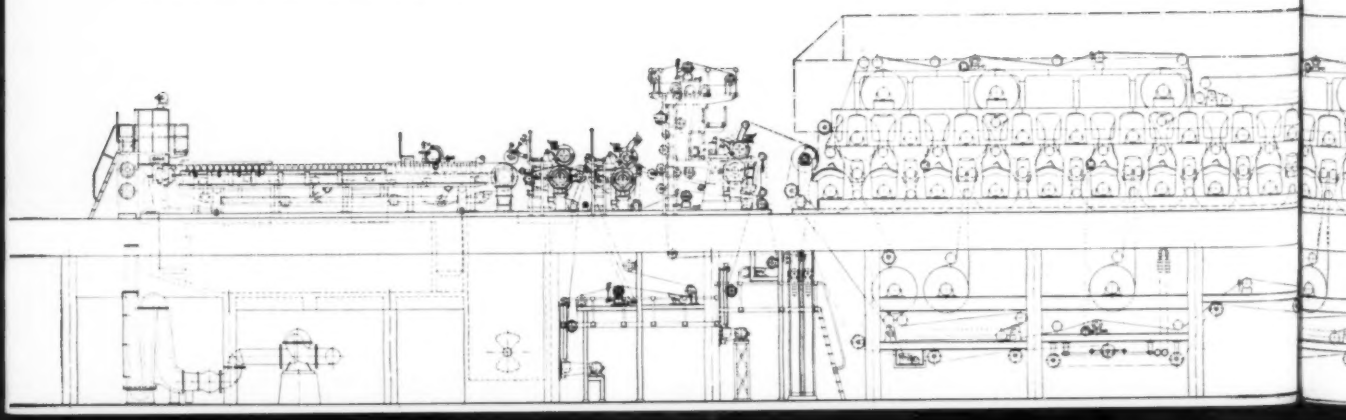
Fourdrinier Wet End.



Dry Part.



Back-side Dryer frames with enclosed gearing.



New Specialty Machine for

NEKOOSA-EDWARDS

A new Puseyjones Fourdrinier Machine for specialty papers began operation at Nekoosa-Edwards Paper Co., Nekoosa, Wisconsin, December 18, 1952.

By working closely with "Nepco" on the design and arrangement of the machine, Puseyjones developed a versatile performer that can be used on many different grades and weights without limiting production. The machine is designed for a speed range of 400 to 1200 feet per minute, with a minimum turn-over speed of 200 ft. per minute.

The satisfactory performance of the Nepco machine reflects the determination of Puseyjones to "live with" every job until mill management says "well done."

Whether you are interested in a complete new high-speed papermaking machine or in rebuilding your present machines for better profit, it will pay you to talk to a Puseyjones engineer now. Write or call us today.

THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery

Fabricators and Welders of all classes of Steel and Alloy Products

Wilmington 99, Delaware, U.S.A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

FEATURES OF 180" PUSEYJONES FOURDRINIER SPECIALTY MACHINE AT NEKOOSA-EDWARDS

Fourdrinier Part: Suitable for wire 180" wide, 85' long, with 26" dia. breast roll, 7½" dia. table rolls and 36" dia. suction couch roll. Wire changing is accomplished with "Rapi-Drape" device.

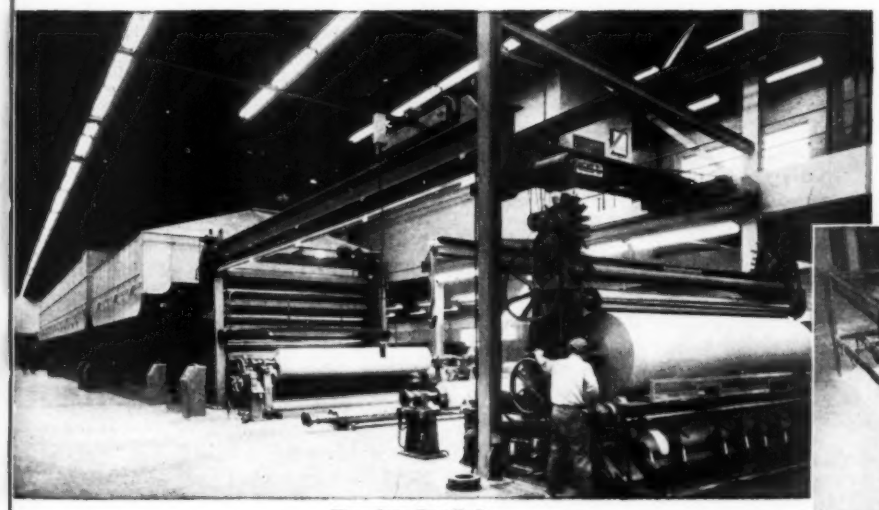
Press Part: Two main presses each consisting of a 30" dia. suction press roll and 28" dia. top roll with one set of plain press rolls. The third press is a reversed press. A plain bottom press roll may be used in the second press position if desired. A Pneumatic controlled water-marking device operates in connection with the third press.

Dry Part: Consists of 36 paper dryers and 12 felt dryers, all 60" diameter, in two separate sections, each section having 18 paper, 4 Feeney and 2 return felt dryers. A third section, consisting of 14 48" paper dryers and 2 felt dryers, follows a Size Press.

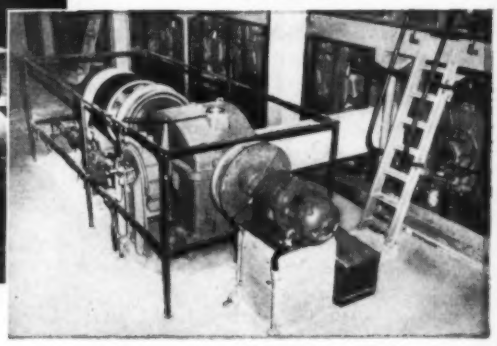
Drive: Individual cone drive unit design with enclosed hypoid reduction gearing and a main line shaft in the basement coupled to a Worthington steam turbine of 1000 BHP. Each dryer section drive unit is equipped with an air-actuated brake device for more quickly bringing dryers to stop when desirable.

Controls: All drive and machine controls set in consoles. Such units as lump breaker roll, upper press rolls and calender stack are entirely air controlled. Such units as breastroll lift, fourdrinier wire change and suction box oscillator are equipped with hydraulic controls.

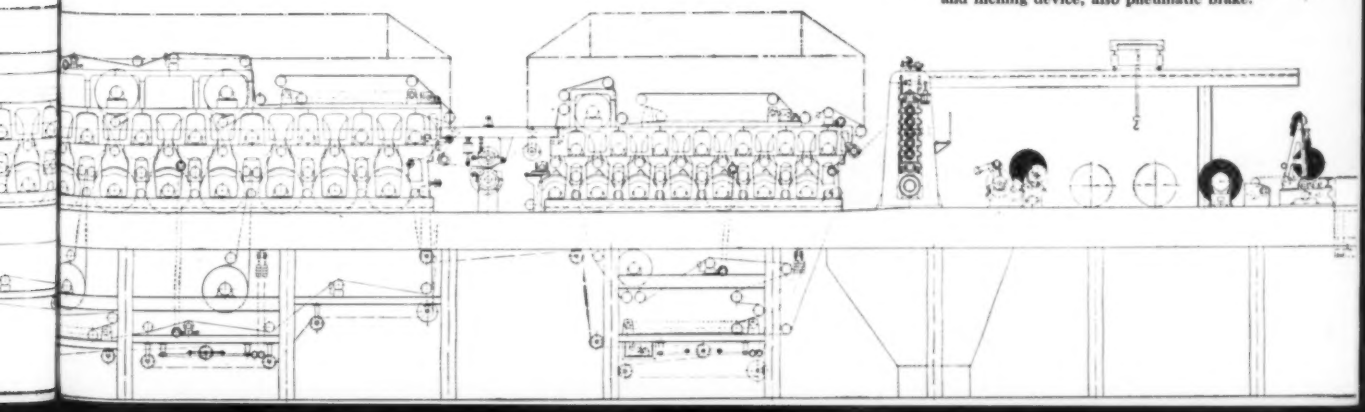
8-roll Calender stack, Beloit centerwind reel and high speed Cameron Winder with latest roll handling mechanism are provided at the finishing end.



View from Dry End.



Drive unit for dryer section with motor-operated starting and inching device, also pneumatic brake.



from the American bandsaw mill and the Swedish gangsaw mill, housed together in the same building, is to be 180,000 board feet. Annual sawn timber output from the firm's four sawmills will amount to 60,000,000 board feet, largest for any single organization in the Southern Hemisphere.

The development includes, in addition to the pulp and paper mills, an administration block, a garage housing more than 300 vehicles, an airstrip, and a housing project of 600 units.

The water supply for the Kinleith pulp and paper mills will be pumped through 5½ miles of 32-inch diameter spiral-welded pipes, delivering 14,500,000 gallons of water daily from a tributary of the Waikato River, New Zealand's largest.

Wis. Anti-Pollution Progress Compares Favorably with European Efforts

THE PROGRESS of Wisconsin pulp and paper mills in reducing sulfite stream pollution compares favorably with what is being done in Europe, according to G. K. Dickerman, technical director for Consolidated Water Power & Paper Co., Wisconsin Rapids. Mr. Dickerman recently returned from a survey trip to Scandinavia and other papermaking areas on the Continent.

"The most notable difference between what European sulfite manufacturers and Wisconsin mills are doing to reduce stream pollution is in their purposes for putting spent liquor through processing plants," Mr. Dickerman declared. "Wisconsin mills are installing evaporators and burners or building yeast plants for the purpose of keeping the state's streams as close as possible to their natural condition for good fishing.

"European sulfite mills in their work with the liquor are almost solely concerned with the production of valuable by-products," he continued. "Particularly in Scandinavia, geographic and economic conditions combine to return a profit from by-products processes that in this country are sheer expense. Coal in Sweden or Finland costs roughly double what it costs in Wisconsin, so those mills save money by evaporating and burning their waste liquor. Alcohol can be made there from sulfite liquor at lower costs than it can be imported. Road paving materials are so costly that sulfite roadbinder sells for a good price at the mill, whereas we in Wisconsin give it free to anyone who will haul it away.

"This trip leaves me feeling proud of the progress that the Wisconsin sulfite industry is making in reducing pollution. Ours is true conservation, and nobody in the world is going ahead more rapidly than the Wisconsin mills."

Rhinelander Stream Improvement Project Operating Smoothly

None of Rhinelander Paper Co.'s collected spent sulfite liquor is entering the Wisconsin River unprocessed, the firm announced recently, two months after starting up the first full-scale evaporator in the Wisconsin sulfite pulp industry.

"We are progressing quite nicely on the operation of this unit," J. M. Holderby, manager of the by-products division, declared. "We have not found it necessary to make any major changes in the equipment, although some minor piping and instrumentation alterations have been accomplished. Our tests indicate that the pollution reduction on the throughput of the unit has amounted to about 95 per cent.

"Due to the intricacies involved, the evaporator is not yet running at full designed production capacity, but progress has in our estimation been quite satisfactory. We should be up to full production in a very short while.

"All of the liquor that we collect," Mr. Holderby continued, "is being desugared in the torula yeast plant of Lake States Yeast Corp. About three-quarters of the desugared liquor from the yeast plant is now being processed through our new evaporator plant."

Mr. Holderby, who is also vice president of Lake States Yeast, declared that "burning the concentrated liquor under our boilers has worked out fully as well as we expected. By now our combustion experience has left us reasonably sure that we know the technique of burning this fuel and have it down to a routine. But as yet we do not know the long-term effects on equipment, such as possible corrosion of boiler plates and tubes."

Completion of the evaporator building has gone ahead steadily since the unit was "turned on" in mid-November. Heat insulation is ready to be applied to the equipment as soon as the engineers say there is no likelihood of further major modifications.

C-Z Anti-Pollution Program at W. Linn Called Successful

The first-year operation of a sulfite liquor sump at West Linn, Ore., by Crown-Zellerbach Corp. has proved successful in eliminating polluting agents during periods of low water, according to J. H. Moak, plant engineer. Release of the stored liquor from the 19-acre lagoon was completed recently, just prior to the high level stage of the Willamette River. The release valve, left open, permits the river to back up into the lagoon during exceptionally high water levels. Considerable liquor remained in the lagoon, but most of the volume was run-off water from the hills above, together with a small amount of river seepage.

Mr. Moak pointed out that the long dry season in 1952 gave the lagoon-storage project a severe test. He said that it proved successful in holding from the high-temperature, low-level river water the oxygen-eating sulfite liquor. As water temperatures dropped in the late fall, release of the liquor was approved by state sanitary authorities. Mr. Moak explained that the oxygen content of the river water was less affected by pollution when at a low temperature. No liquor waste was dumped during the summer low - water, high - temperature periods.

Foreseen during the design of the system was the possibility that heavy portions of the liquor, pumped more than 4,200 ft. from the paper mill to the lagoon, might create a sludge problem. This deposit of solids, principally at the lagoon where the pipeline dumps, might make dredging necessary. However, state officials and representatives of other interested groups have inspected the specially designed pumping system, the pipeline, the lagoon and the discharge project and have given them their approval.

Anti-Pollution Notes

Consolidated Water Power & Paper Co.,

Appleton, Wis., has announced that all essential parts of Interlake Mill's evaporation-and-burning plant for reducing sulfite pollution of the Fox River now have been received from the fabricators. Installation of the quadruple-effect

SIMPLE and EASY TO USE

Midwest Reducing Elbow replaces two fittings: (1) a straight size elbow and (2) a reducer. One weld is eliminated with a resultant saving in layout time, welding, and cost. Pressure drop is reduced, appearance is improved and the piping is easier to insulate. Sizes to 12", reductions to half size.

Children get the hang of a bubble pipe almost by instinct . . . it's so simple and easy to use. Pipe welders report that they find Midwest Welding Fittings simple and easy to use because they are so uniform . . . so accurate to dimension . . . and because of their greater variety. Representative of this greater variety is the Midwest Reducing Elbow (shown at right) which takes the place of a standard elbow and a reducer . . . requires only two welds instead of three. For more information on why Midwest Welding Fittings are simple and easy to use, ask for Catalog 48.

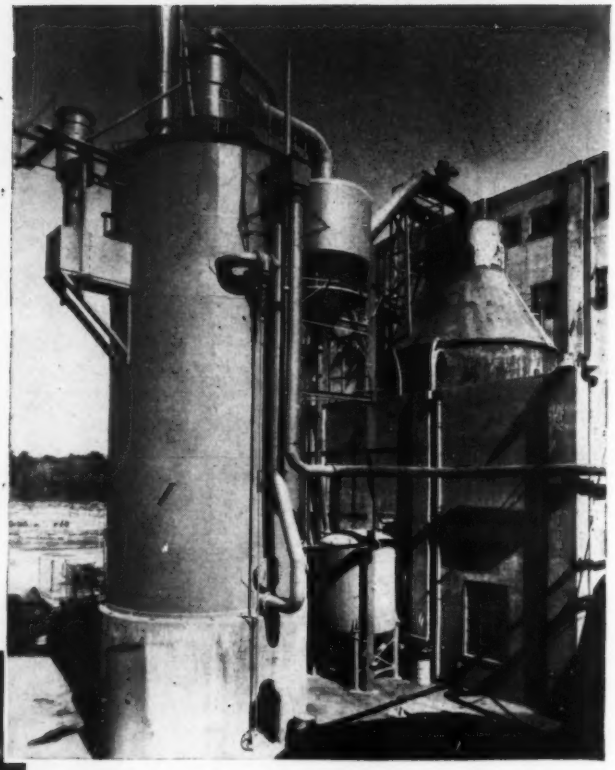
MIDWEST PIPING & SUPPLY CO., INC.
Main Office: 1450 South Second Street, St. Louis 4, Mo.
Plants: St. Louis, Passaic, Los Angeles and Boston
Sales Offices:
New York 7—50 Church St. • Chicago 3—79 West Monroe St.
Los Angeles 33—520 Anderson St. • Houston 2—1213 Capitol Ave.
Tulsa 3—224 Wright Bldg. • Boston 27—426 First St.
STOCKING DISTRIBUTORS IN PRINCIPAL CITIES

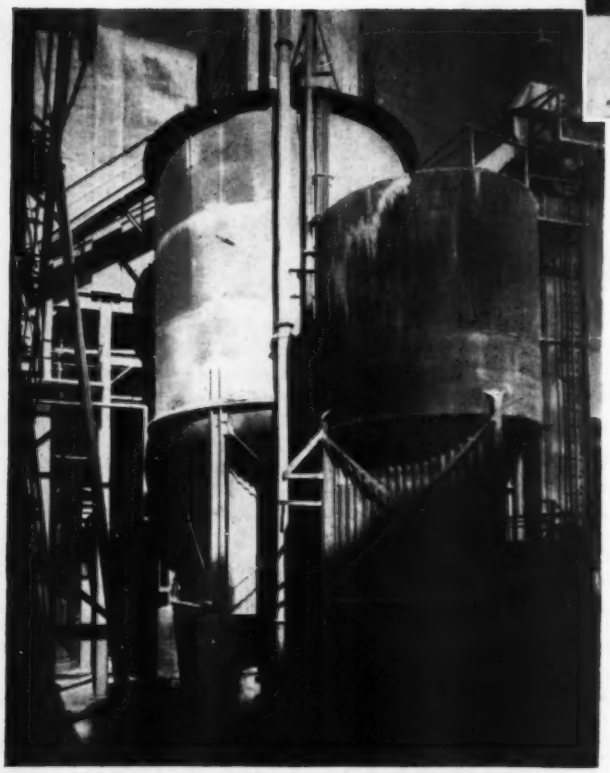
MIDWEST WELDING FITTINGS

MIDWEST
WELDING FITTINGS
Improve Piping Design and Reduce Costs

HORTON Steel Plate Structures

a familiar sight in the pulp and paper industry





Above Right: 18-ft. diam. by 40-ft. accumulator at left and 26-ft. diam. blow tank at right. Above: Reburned lime and fresh lime storage tanks fabricated and erected by Chicago Bridge & Iron Company.

The 18-ft. diam. by 40-ft. accumulator and the 16-ft. diam. blow tank shown above are two of the many types of steel plate structures we fabricated and erected at the Weyerhaeuser Timber Company's Pulp Division plant at Springfield, Oregon.

Our facilities for designing, fabricating and erecting steel plate structures are *complete.* Supplying digesters, chip tanks, blow tanks, seal tanks, storage tanks, elevated water tanks and Marx Savealls made of carbon steel is a regular part of our business. We also build tanks of non-corrosive metals, or we can furnish corrosion-resistant clad or lined structures whenever mill conditions require it. We have complete facilities for x-raying and stress-relieving and recently enlarged our facilities for painting and pickling fabricated steel plate work by the Horton phosphoric acid process.

When your plant requires new tanks or steel plate work to keep pace with the ever growing demand for paper products, investigate the experience and facilities of Chicago Bridge & Iron Company. We have four plants ready to provide you with reliable, efficient service. Write our nearest office for estimates and quotations. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

Atlanta, 3.....2143 Healey Building
Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026—201 Devonshire Street
Chicago, 4.....2445 McCormick Building
Cleveland, 15.....2267 Midland Building
Detroit, 26.....1566 Lafayette Building
Havana.....402 Abreu Building
Houston, 2.....2143 C & I Life Building
Los Angeles, 17.....1559 General Petroleum Building
New York, 6.....3350—165 Broadway Building
Philadelphia, 3.....1653—1700 Walnut Street Building
San Francisco, 4.....1547—200 Bush Street
Seattle, 1.....1327 Henry Building
Tulsa, 3.....1651 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

evaporator is progressing steadily, and company engineers planned to stage the first trial run late in January.

Northern Paper Mills,
Green Bay, Wis., has been granted until June 30 to complete water pollution abatement facilities by the Wisconsin Committee on Water Pollution. The firm had been ordered by the committee to install the facilities for evaporating and burning spent liquor before January 1, but delay in receiving equipment held up the project.

Nepco Foundation Gives $18,650 to Local, State Institutions

Year-end contributions totaling $18,650 have been distributed to 10 local institutions and three Wisconsin colleges by the Nepco Foundation of Nekoosa-Edwards Paper Co., Port Edwards, Wis. The announcement was made by John E. Alexander, president.

The three schools that received $500 each are Wayland Academy, Beaver Dam; Ripon College at Ripon, and Lawrence College, Appleton. The Lithographic Technical Foundation received $150.

Among the local instiutions on the list of recipients were Riverview Hospital, $3,000; Nepco Lake Boys & Girls Club Association, $3,000, and the Community Chest, $4,000. Six local churches received $1,000 each, while three others were given a total of $1,000.

Nekoosa-Edwards recently presented the foundation with a year-end gift of $197,400, including cash in the amount of $125,000 plus a number of houses owned formerly by the paper firm.

Bergstrom Foundation formed

Formation of the Bergstrom Foundation has been announced by officials of Bergstrom Paper Co., Neenah, Wis. Trustees will be empowered to administer income for the support of charitable and educational institutions.

Foundation members, who will also serve as first trustees, are N. H. Bergstrom, president of the paper firm; J. Russell Ward, president of the First National Bank of Neenah, and Ambrose H. Owen, bank vice president.

Gulf States donates equipment

Dr. K. W. Coons, head of the department of chemical engineering at the University of Alabama, has announced that Gulf States Paper Corp., Tuscaloosa, recently presented the university with a collection of recording and control equipment. The instruments are to be added to the equipment now available in the instrumentation laboratory, which has been called the most completely equipped in the Southeast.

Newsprint Demand to be Satisfied by Boosts in Production, NAC Says

WITH MINOR VARIATIONS, the course of world newsprint production for the period 1925-1952 is simply the counterpart of world consumption or demand. Thus production, over the years, shows the same characteristics of growth and relative stability. And for 1953 it would appear that world production can meet world demand. These conclusions were drawn in the Newsprint Association of Canada publication, "Newsprint Data: 1952."

Concerning the Canadian production outlook, the NAC points out that between 1925 and 1952, the Canadian newsprint industry added 4,000,000 tons to its annual production. "Although no long range projections are available," the report continues, "the estimates of production potential through to 1960 suggest that a comparable expansion can be achieved in the longer period to 1975, given the economic incentives to do so."

Production in the United States during 1953 has been estimated at 1,175,000 tons, a slight increase over the 1,170,000 tons of 1952. (The 1935-39 average for the U.S. was 907,804 tons.) For 1953 Canadian production is seen as 5,700,000 tons, as against the 5,690,000 tons of 1952. (The 1935-39 average for Canada was 3,336,786 tons.)

Estimated total world production for this year has been placed at 10,898,000 tons, while demand will approximate 10,873,000 tons. Helping to achieve this balance is the increased output of four leading producers. These nations, together with their increases over prewar, are as follows: Canada, 2,363,000 tons; U.S., 267,000 tons; Russia, 203,000 tons, and Sweden, 77,000 tons. On the other hand, two nations have shown definite decreases: Great Britain, 312,000 tons, and the Soviet zone of Germany, 196,000 tons.

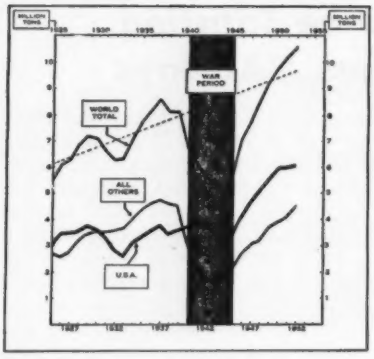
Production outlook

The NAC in discussing the future trend of world production points out that "no independent estimate can be made . . . ," the trend related on the one hand to potential demand and, on the

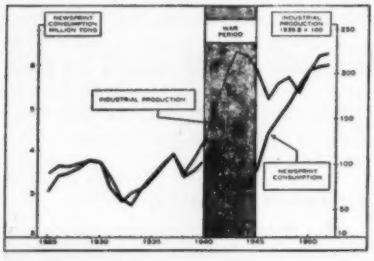
World Newsprint Production

Country	Average 1935-39	1950	1951	1952	1953
Canada	3,336,786	5,278,585	5,516,279	5,690,000	5,700,000*
U.S.A.	907,804	1,014,703	1,124,748	1,170,000	1,175,000
Argentina	0	1,000	6,600	22,000	50,000
Brazil	4,000	34,130	37,780	40,000	50,000
Chile	4,350	12,000	12,000	13,000	14,000
Peru	n.a.	4,400	500	500	500
Britain	961,800	609,280	590,100	580,000	650,000
Finland	436,125	459,826	453,758	463,000	468,000
Norway	205,500	175,235	179,679	173,000	175,000
Sweden	299,015	357,904	365,496	376,000	376,000
Austria	70,550	80,000	84,700	99,000	110,000
Belgium	51,820	68,000	65,875	68,000	68,000
France	360,600	336,000	355,000	355,000	355,000
German Republic	166,000	187,000	178,760	195,000	215,000
Netherlands	99,285	95,000	109,500	113,000	113,000
Portugal	0	2,525	2,238	2,000	2,000
Switzerland	34,500	52,000	55,000	55,000	55,000
Italy	74,500	94,800	112,000	129,000	129,000
Spain	27,600	25,000	25,000	26,000	27,000
Turkey	0	5,000	7,000	7,000	7,000
Egypt	0	1,500	1,500	1,000	1,000
Taiwan (Formosa)	Incl. in Japan	3,800	6,370	7,000	10,000
Japan	406,200	145,281	253,957	300,000	360,000
South Korea	Incl. in Japan	2,000	15,000	15,000	15,000
Australia	0	35,000	35,600	34,000	50,000
Sub-Total	7,446,435	9,079,969	9,594,440	9,933,500	10,175,500
Germany-Sov. Zone	345,690	150,000	150,000	150,000	150,000
Poland	33,770	55,000	60,000	60,000	60,000
Russia	221,820	400,000	400,000	425,000	425,000
Bulgaria	1,650	4,000	4,000	4,000	4,000
Czechoslovakia	42,800	53,000	53,000	53,000	53,000
Hungary	5,295	6,000	6,000	6,000	6,000
Roumania	5,000	4,500	4,500	4,500	4,500
China	0	20,000	20,000	20,000	20,000
North Korea	Incl. in Japan	n.a.	n.a.	n.a.	n.a.
Sub-Total	656,025	692,500	697,500	722,500	722,500
World Total	8,102,460	9,772,469	10,291,940	10,656,000	10,898,000

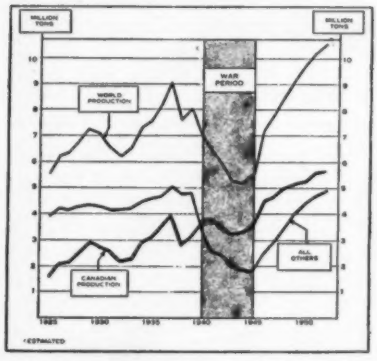
1952-53 estimated



Newsprint consumption 1925-52



U. S. newsprint consumption



World production: Canada and all others

other, to the availability of raw material supplies. It has been forecast by some experts that the demand by 1975 will approach 16,000,000 tons. Thus, the question is raised as to whether resources will exist to support an increase in production of 5,250,000 tons, or 50 per cent.

"This increase," says the report, "would not require a rate of growth as rapid as that for the period 1925-50, when world production increased 77 per cent. It would, however, mean new demands on world forest resources which they are less able to absorb.... The use of sugar cane waste (bagasse) has been widely publicized in connection with the world's growing newsprint needs.... On the basis of present evidence, it seems more likely to be destined for use in conjunction with woodpulp in the manufacture of other types of paper, thus freeing wood fibre for use in newsprint."

In Canada, the individual expansion plans of newsprint mills through to 1960 show that the potential increase in production will be roughly 1,500,000 tons, with more than 75 per cent of this increase concentrated in the first half of the period. Of the ton total expected during the period, 681,000 will come from machine improvements, 501,000 from new machines, 344,000 from new mills. (The approximately 700,000 tons that will result from machine improvements almost duplicate the record of the seven years from 1946 to 1952, inclusive, when 725,000 tons of new capacity were added by this means.)

Demand outlook

Current indications point to a further increase in world demand for 1953. There is in prospect a continuation of the rising post-war trend of demand although, depending to a large degree on the U.S. trend, the rate of increase may be smaller.

U.S. demand for 1953 is estimated to be between 6 and 6.2 million tons. U.S. total supply (and demand) for 1952 is now forecast at 6,110,000 tons, and the 1953 projection is thus expected to be within 100,000 tons above or below this figure. Estimates of 1953 demand for all other countries total 4,773,000 tons, "but the use of this figure implies a greater degree of precision in the estimates than is, in fact, justified."

In the period reviewed (1925-1952) world newsprint consumption shows a rising trend, with annual increments averaging more than 131,000 tons. While the fact of this trend in the past does not itself ensure continued growth in the future, other evidence supports this view.

For the U.S. market, the President's Materials Policy Commission (Paley Report) provides an estimate of consumption of 8,700,000 tons for 1975, equivalent to a 45 per cent increase over the 1952 level. Against a 45 per cent gain in U.S. requirements, a somewhat higher proportionate increase may be assumed for all other countries. This would allow for the higher demand potential in these countries, in accordance with their present relatively low consumption rates. An increase of 60 per cent, according to NAC, is not unreasonable. Such an increase would bring the combined requirements of these countries to 7,300,000 tons and would bring total world demand to a round figure of 16 million tons by 1975.

New capacity prospects

The following summary includes new mill projects or plans for additions to existing mills as gathered by the Newsprint Association of Canada from press or trade reports in recent months. In compiling the data, NAC pointed out that no attempt had been made to judge the accuracy of the reports nor the extent to which the projects or plans may be considered as firm.

St. Lawrence Corp. Ltd., Red Rock, Ont.; reconversion of the existing kraft paper machine to the manufacture of newsprint; output, starting in 1954, to be an annual 60,000 tons.

Celgar Development Co. Ltd., Castlegar, B.C.; planned construction of two and possibly four new mills, including a newsprint unit with a daily production of 275 tons.

Powell River Co. Ltd.; possible construction of a mill at Kitimat, B.C.

Yates, Alberta; project to build a pulp mill still in the planning stage; initial reports were that a newsprint mill was to be included.

Bowater Southern Paper Corp., Calhoun, Tenn.; started construction of a 130,000-ton-per-year mill; operation expected in 1954.

Great Northern Paper Co., Millinocket, Maine; construction of a mill with a capacity of 124,000 tons annually approved by DPA.

Southland Paper Mills Inc., Lufkin, Texas; addition of 60,000 tons to capacity.

West Tacoma Newsprint Co., Steilacoom, Wash.; present capacity to be expanded by 40,000 tons.

Paper Corp. of America, Cheboygan, Mich.; upon completion of conversion and expansion will have a daily newsprint capacity of 120 tons; plans call for installation of machine to produce an additional 200 tons.

Michigan Paper Co., Plainwell, Mich.; expanding present capacity by 11,000 tons.

Publishers Paper Co., Oregon City, Ore.; adding 4,000 tons capacity.

United Newsprint Mills; plans to establish a newsprint mill between Cincinnati and Dayton, Ohio, to produce a daily 100 tons by late 1953 and subsequently 200 daily tons from reprocessed waste paper.

Columbine Pulp & Paper Inc., New Castle, Colo.; proposed construction of a 50,000-ton mill.

Warrensburg Pulp & Paper Co., Warrensburg, N.Y.; suggestion by Isadore Baum that a former tissue mill which has been producing about 1,000 tons per month for export be expanded to a 100,000-ton operation.

Other nations

Elsewhere in the world production expansion is continuing at a fast pace. In *Finland*, two mills now under construction promise an eventual annual production of 170,000 tons; *Sweden*, one machine being added; *Great Britain*, a reported new capacity planned to total 110,000 tons; *New Zealand*, plans for

ANOTHER BIG REASON for installing A CURLATOR

14 LEADING MILLS ARE NOW CURLATING THEIR PULP

Since the Curlator was first announced in 1949 fourteen leading pulp and paper mills in the United States and Canada have installed them. Five mills have made multiple installations (one mill having eight Curlators). Proof in itself that Curlation improves paper qualities, saves wood, cuts costs. If your mill isn't Curlating pulp it will pay you to investigate, for only a Curlator can give you all these benefits:

INCREASED YIELD OF 5% is common in many normal pulps, since Curlation eliminates No. 2 pulp and fine screen rejects... converts shives and fiber bundles into No. 1 pulp. 65% yield in news sulphite is thoroughly practical.

INCREASED TEARING STRENGTH is imparted to paper made from Curlated pulp because fibers are given a permanent bend and twist. Tearing strength has been increased up to 60%.

FREENESS is retained because Curlation can not cut fiber. Curlator patented action rolls fiber and fiber bundles under pressure . . . imparts a permanent bend and twist.

WRITE for more detailed information. See the finer paper that can be made from your own pulp.

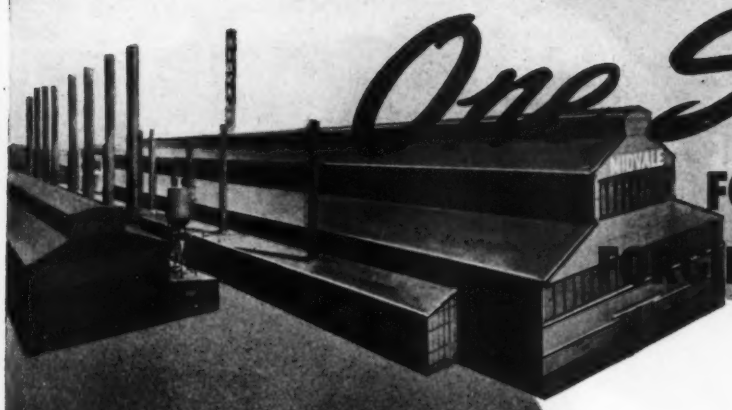
CURLATOR† Corporation
EAST ROCHESTER, NEW YORK

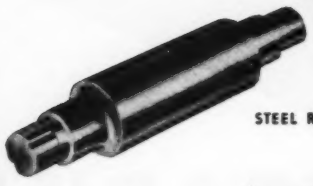
†T.M. Reg.—Curlator Corporation, East Rochester, New York

Canadian Representative—Homad Services, Ltd., Montreal

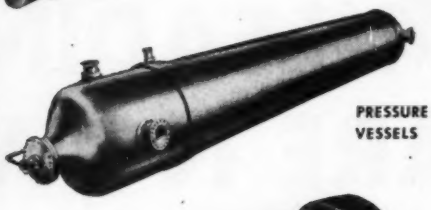
One Source

FOR "SPECIFICATION" FORGINGS AND CASTINGS

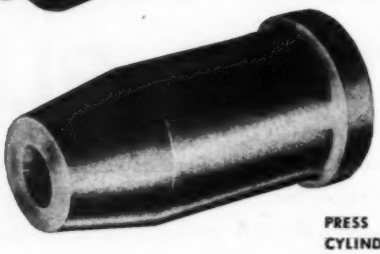




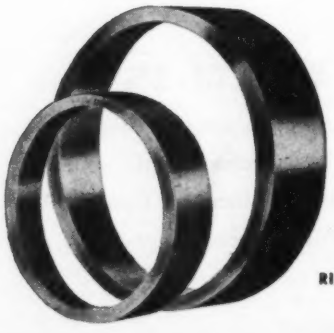
STEEL ROLLS



PRESSURE VESSELS



PRESS CYLINDER



RINGS

Name your requirements . . . show us your blueprints . . . and Midvale engineers and craftsmen working with the finest equipment will produce the forgings or corrosion and heat resisting castings you need.

Midvale can assure you of the finest in craftsmanship, precision and ultimate performance. Whether it is weldless gear rings for turbine speed reduction . . . cylinders for hydraulic presses . . . weldless high-pressure vessels for oil refining, gas reactions and steam generation or hardened and ground steel rolls for cold rolling steel, aluminum, copper, brass, zinc, foil, paper, linoleum, plastic and rubber, Midvale engineers can help you design them. Midvale craftsmen will build them to your most exacting specifications. Put your forging and casting problems in our hands . . . you'll be satisfied with the results.

THE MIDVALE COMPANY

NICETOWN, PHILADELPHIA 40, PA.

OFFICES: NEW YORK • CHICAGO • PITTSBURGH
WASHINGTON • CLEVELAND • SAN FRANCISCO

MIDVALE

Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

two mills call for a total output of 120,000 tons; *Brazil,* a new machine expected to be in production late this year; *Chile,* installation of two new mills with a total output of 65,000 tons; *Mexico,* Mexican-Italian enterprise planning a 60,000-ton operation; *Peru,* Peruvian and French interests contemplating mills with production of a yearly 12,000 metric tons; *India,* project planned for production by the end of 1953 will turn out an estimated 30,000 annual tons; *South Africa,* mill to have an eventual capacity of 40,000 yearly tons; *Austria,* mill, with MSA aid, is expanding capacity, and *Germany,* new machine to be in operation sometime this year.

December Newsprint Statistics

Production in Canada (including Newfoundland) during December 1952 amounted to 463,377 tons and shipments to 463,064 tons. Output in the United States was 86,659 tons, and shipments were 83,007 tons, making a total North American production of 550,036 tons and shipments of 546,071 tons, compared with continental production of 527,050 and shipments of 553,176 in December 1951. These figures were released by the Newsprint Service Bureau, which pointed out that total output in December 1952 exceeded that of any December on record.

The North American output of newsprint paper in 1952 amounted to a record high of 6,833,915 tons, of which 5,687,051 were made in Canada and 1,146,864 in the United States. The Canadian mills produced 170,722 tons, or 3.1 per cent, more than in 1951, while the output in the United States was 22,116 tons, or 2 per cent, greater than in 1951. Thus, the total continental increase amounted to 192,888 tons, or 2.9 per cent.

Stocks of newsprint paper at the end of December were 122,512 tons at Canadian mills and 11,726 tons at U.S. mills, making a total of 134,238 tons, as compared with 130,237 on November 30, 1952, and 109,478 at the end of December 1951.

Dr. Stevenson Leaves APPA

DR. LOUIS T. STEVENSON is retiring as economist for the American Paper & Pulp Association effective March 1. He has announced plans to become associated with the investment house of Tucker, Anthony & Co., New York, N.Y., where he will be available for consultation by APPA and other associations and firms in the paper and pulp industry.

Succeeding Dr. Stevenson is *JOHN L. VOGEL,* economist for the Pulp, Paper and Board Division of the Office of Price Stabilization. He took the post February 1.

L. O. Schubart

D. K. Brown

I. J. Stafford

D. H. Severson

Neenah Paper Announces New Management Line-Up

At their recent annual meeting, directors of Neenah Paper Co., Neenah, Wis., announced a new line-up in the top executive management.

LEO O. SCHUBART, executive vice president since 1951 and a director and treasurer since 1928, has been elected president and general manager. *D. K. BROWN,* the retiring president, was elected chairman of the board of directors and is being retained for advice and consultation.

I. J. STAFFORD, general superintendent since 1923 and director of mill operations since 1951, has been made vice president for manufacturing. *DAN HARDT,* sales manager since 1948 and a director since 1951, has been elected vice president for sales.

D. H. SEVERSON, a director since 1948 and treasurer since 1951, has been chosen secretary-treasurer. *FRED LEECH* has been appointed sales manager. He was elected a director in 1952.

Mr. Brown's retirement from active management of Neenah follows a long career in the paper industry. He joined Neenah Paper in 1908. He has served as president of the Writing Paper Manufacturers Association and for two years (1944 and 1945) was president of APPA. During World War II Mr. Brown served on the over-all advisory committee to the WPB for the pulp and paper industry. He is currently a member of the advisory committee to the NPA and of the board of governors of the National Council for Stream Improvement. He was a founding trustee of the Institute of Paper Chemistry at Appleton and has continued as a trustee since that time, serving now on the executive and finance committee.

Japan Eyes Alaskan Pulpwood; Northwest Interests Critical

JAPANESE INTEREST in pulpwood timber resources in Alaska was revealed in January when a party of Japanese industrialists and government officials arrived in Juneau for a month's stay in the territory.

The Japanese objective, according to Takuji Oshima, is to first establish a sawmill at Sitka, with pulp operations to be considered at a later date. Mr. Oshima is executive director of the Council for Integrated Counter Measures for Forest Resources of Japan and a spokesman for the visitors.

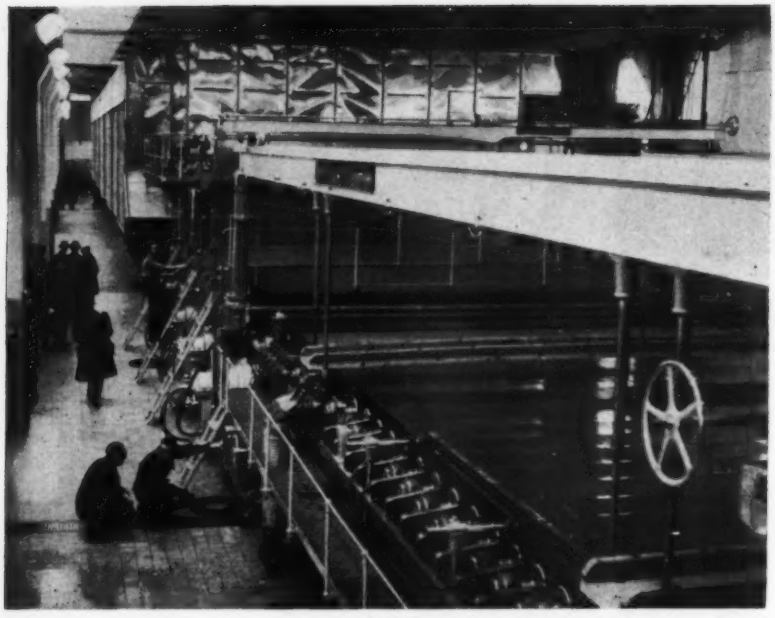
Prior to World War II Japan imported more than one billion board feet of lumber annually from the United States and Canada. Last year that figure had been reduced by approximately 98 per cent. Loss of the timber resources of the Sakhalin and Kurile islands, ceded to Russia, has cut deeply into pulpwood reserves, Mr. Oshima stated.

Commenting on the proposed action, B. Frank Heintzleman, Alaska regional forester, said that Japanese forest products interests in the territory must be managed by an American corporation and staffed with American personnel.

Competitive bidding

Charles Burdick, assistant regional forester in charge of Alaska timber management, told newsmen in Seattle that unless there has been an understanding with the State Department of which he is not aware, the Japanese, who are seeking timber rights in the Tongass Forest Reserve, must obtain their timber by open competitive bidding. He said that he was making the statement to allay the suspicions and fears voiced by Pacific Northwest pulp and timber interests that the Japanese may be sold a substantial part of the 78 billion board feet of the Tongass reserve, to the exclusion of American interests.

Mr. Burdick pointed out that the pulp mill now being built at Ketchikan by Puget Sound Pulp & Timber Co. and American Viscose Co. was not started until adequate timber reserves had been assured. The timber, he said, was offered



GIANT NEW KRAFT paper machine recently installed at the Gruvon, Sweden, mill of Billerud Co.; the machine, largest kraft unit ever installed in Sweden, has an annual capacity of 30,000 tons, a length of 330 ft., and a trimmed machine width of 17 ft. 3 in.; it was constructed by the Karlstad Works and is driven by 11 dc motors; the speed of the wire can be varied from 230 to 1,150 fpm, the design permitting a further increase to 1,475 fpm; the drying section consists of 40 cylinders and 10 felt dryers

for competitive bidding by the Forest Service, and the builders of the mill were the only bidders. It may be that the timber eventually to be offered for competitive bidding in the Sitka area may result in a bid from the Japanese only. But it will be duly advertised, nevertheless, and American interests will have the same opportunity to bid as the Japanese.

American interests critical

Pacific Northwest timber interests have been critical over the possibility that even though the Japanese may be compelled to use American labor, profits from the timber cutting would be diverted to Japan by the make-up of the operating corporation.

What the Pacific Coast pulp industry now fears, according to its spokesmen, is that after Japanese reserves were handed over to the Russians with the transfer of the Sakhalin and Kurile islands in secret conferences at Yalta, commitment was made to the Japanese that their timber deficiency would be made up by permitting them to draw on the Alaskan reserves.

It has also been learned that negotiations between the State Department and Japan were begun in 1946, and that the first revelation to the American public was by the Department of Commerce after it had accidentally discovered a story of the extended negotiations published in a Japanese newspaper.

An inquiry to the State Department, according to Department of Commerce officials in Seattle, brought forth a flat and absolute denial. But when confronted with the Japanese news story and the fact that Japanese officials were meeting with State Department representatives, the latter reluctantly admitted that negotiations were underway.

Expanded Research in Insect and Disease Control Urged

Six consultants representing various phases of forestry in all sections of the country have urged the U.S. Department of Agriculture to expand research leading to better forest insect and disease control. Appointed by Secretary of Agriculture Charles F. Brannan, they concerned their study with helping the Department meet its responsibilities under the Forest Pest Control Act of 1947.

According to the USDA, the consultants recognized that although the Department must continue to strengthen its short-time research efforts in order to meet current problems satisfactorily, it must also keep in mind the more basic, long-time research needs. These are concerned with (1) knowledge as to the causes underlying the rise and fall of insect populations; (2) the factors responsible for the origin, development, and decline of epidemics, and (3) ways of preventing their occurrence, thus insuring more permanent control.

Industry representatives participating in the study were Walter Damtoft, assistant secretary of Champion Paper & Fibre Co., Canton, N.C.; D. Clark Everest, board chairman of Marathon Corp., Rothschild, Wis.; Ernest Kolbe, forester for Western Pine Association, Portland, Ore.; Fred H. Lang, president of the Association of State Foresters, Little Rock, Ark.; A. H. MacAndrews, professor of forest entomology at Syracuse University, Syracuse, N.Y., and Fred W. Roewekamp, city forester, Los Angeles.

Northwest battle continues

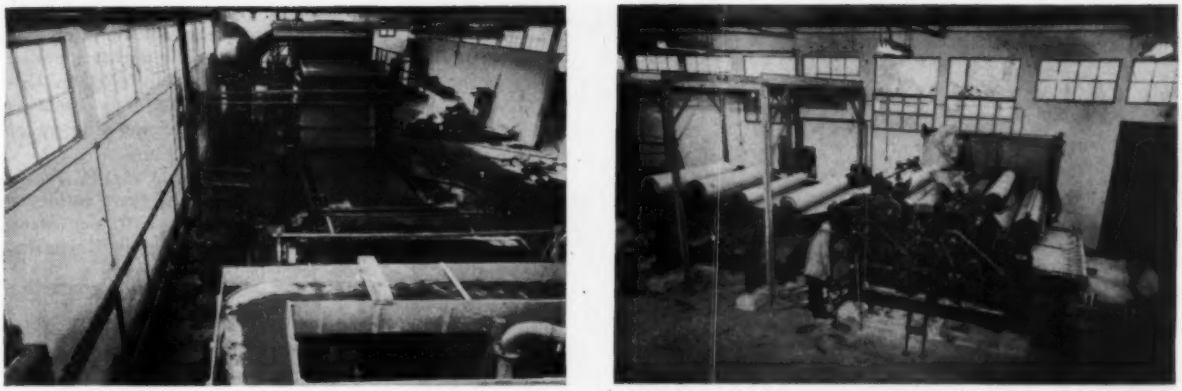
The Oregon State Forestry Department will continue its successful five-year war against the spruce budworm this spring. However, two other serious menaces face the agency, the Douglas fir bark beetle and root rot, for which there is no known prevention. According to George Spaur, the bark beetle and root rot already are destroying many times as much timber as is lost by fire.

The Forest Service has announced that it has $957,798 remaining after "winning" a three-year fight against the outbreak of bark beetles in north central Colorado. Officials said that about half the unspent funds will be returned to the U.S. Treasury, while the remainder will be used to battle insect epidemics in Idaho, Montana, Washington, California, and Mississippi. The end of the 13-year-old outbreak that destroyed 25 per cent of Colorado's spruce forests was announced by Carlos T. Brown, beetle control project director. Five billion board feet of spruce and pine were destroyed.

Rotary brush sprayer found superior

The use of the rotary brush sprayer on airplanes in insect control work is almost certain to replace the boom spray installation both in air force and commercial insect pest control activities, according to the Canadian Department of Agriculture. The rotary unit, manufactured by I. C. D. Equipment Co., Campbell, Cal., was first tested in Canada at Goose Bay in 1951 in biting fly control trials. Cooperating in the project were the Royal Canadian Air Force and the Division of Entomology.

The rotary brush sprayer proved to be much superior, and the RCAF equipped several aircraft with them for aerial spraying last year. A recent experimental demonstration by DeHavilland Aircraft of Canada at Toronto, which was viewed by officers of the Division of Entomology, showed the definite advantages of the sprayer and



VIEWS OF NEW MILL recently put into operation at Lydda, Israel, for the manufacture of wrapping paper; the plant was built through the financial aid of American investors; at the left is a view looking down the machine from the wet end, while at the right is the cutting machine operation; a planned expansion is dependent to a great extent on the success of a bond drive being conducted in the United States

presaged its possible adoption in the commercial pest control field.

Also announced by the Canadian department was the fact that for the fourth successive year in British Columbia methoxychlor has given codling moth control equivalent to DDT. Since it is to be available at a reasonable price in 1953, growers may begin to use it in preference to DDT, since it is virtually non-toxic to mammals and to birds.

Rain-Making Experiments Revealed in Northwest

Rain-making as a weapon to combat forest fires has undergone extensive testing in the Northwest, it was revealed recently by Bernard Orell, Washington State forester. "We believe in some cases we have added to the amount of precipitation and in other cases have caused slight precipitation which would not otherwise have occurred," Mr. Orell declared.

During the Galbraith fire in 4,000 acres of logging slash last July clouds over the burning area were seeded with silver iodide. By midnight rain had fallen, wetting the brush and ending the spread of the flames.

On another occasion, the forestry division had scattered Douglas fir seeds over 360 acres near Forks from a helicopter. Rain was needed for germination. The rain-making equipment was readied, and within a few hours adequate moisture had fallen.

The "weather modification" experiments, as rain-making is called by scientists, were first planned in the spring of 1951. Five generators were obtained. They were modified so as to be suitable for disseminating silver iodide crystals, one of the substances used in cloud-seeding. The equipment was set up in western Washington and operated during eight periods of from one to five days each in the late summer of 1951.

"Either rain fell in the vicinity of the generators or a general rain fell throughout western Washington, with heavier concentrations in the areas in which the generators were working," Mr. Orell declared. Experiments carried on in 1952 showed similar results. Complete cost to the state for the two seasons has been about $2,000.

Nekoosa-Edwards Joins Trees for Tomorrow

Membership in Wisconsin's Trees for Tomorrow Inc. has been boosted to 12 paper mills and four power companies with the announcement that Nekoosa-Edwards Paper Co. of Port Edwards has joined the nine-year-old organization.

The Trees for Tomorrow plan of providing assistance to landowners in the growing of more and better trees will be expanded with the addition of the paper firm, according to Folke Becker, president of Rhinelander Paper Co., who heads the organization. He said that the free distribution of trees would be stepped up from 500,000 to 700,000 seedlings in 1953. The seedlings will come from N-E nurseries.

Formerly the trees were obtained from state nurseries operated by the Wisconsin Conservation Department. It is estimated that 700,000 trees will be distributed in April to those who apply before the March 1 deadline. In previous years the limit had been set at 500,000 trees.

National Forest Receipts Exceed Costs in Fiscal '52

National forest receipts exceeded expenditures by $11,383,571 for the 1952 fiscal year, according to an announcement by the United States Forest Service. During the year ended June 30 the Forest Service collected $71,402,511 from the sale of timber, grazing permits, land-use and water power permits on national forest land. This includes $1,682,313 that is held in escrow pending settlement of questions relating to the status of certain lands in Oregon and Alaska.

Expenditures for operation, maintenance, and development during the same period totaled $60,018,940 and included costs of personnel, general administration, fire protection, insect control, flood control, reforestation, and revegetation, acquisition of land, and construction and maintenance of range improvements, roads and trails, and other improvements.

A little more than $12,000,000 of these expenditures went to capital investments such as reforestation, reseeding, buildings and road construction. Also, through improvements and the timber-cutting methods used, the growing stock of timber has increased.

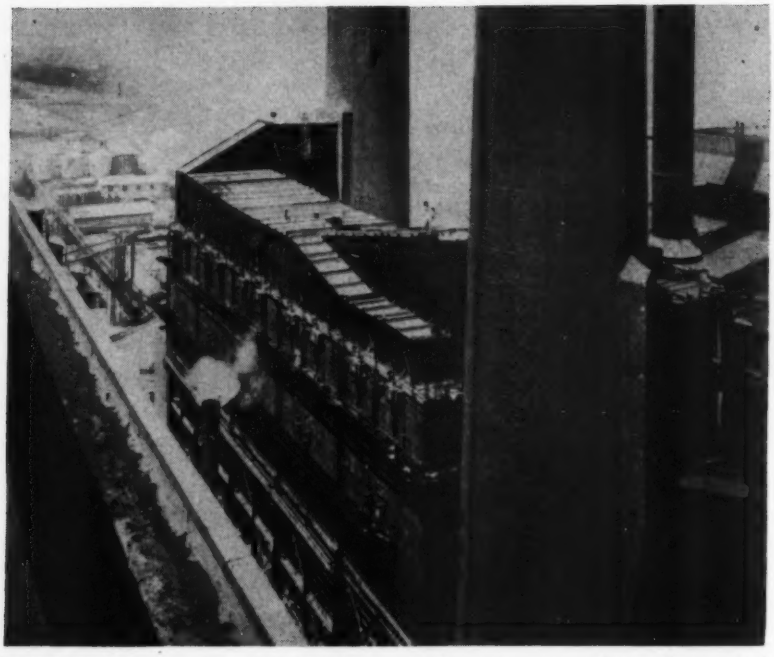
Timber cut volume and value at new high

The volume and value of timber cut on national forests for the three months ended September 30 exceeded that for any other single quarter on record. About 1,627,800,000 board feet were taken, a 10 per cent increase over the same period a year previously. The old record was the 1,482,000,000 board feet cut during July-September 1950.

The value of the tiimber cut during the quarter was $22,715,496, as compared to $18,772,893 for the same period in 1951. The previous record value was $19,360,000 during October-December 1951.

Funds received from the sale of national forest timber are deposited in the U.S. Treasury. At the end of the fiscal year 25 per cent of the receipts is returned to the individual states for public education and roads in counties containing national forest lands.

Volume (in 1,000 board feet) and value of the timber cut in the various USFS regions in the July-September



INSTALLATION of a new-type electrostatic precipitator using a wet-bottom flow method instead of a dry hopper and conveyor system for handling collected dust is nearing completion at Union Bag & Paper Corp., in Savannah, Ga.; the five shown above were completed in 1947 by Research Corp., manufacturer of Cottrell precipitators; the new unit now nearing completion will clean gases from two spray-type recovery furnaces handling a total of more than 2,000,000 pounds of black liquor solids per day, equivalent to a daily pulp production of 700 tons; all precipitators at Union Bag will handle a combined volume of over 875,000 cfm of gas on full load at about 275° to 300°F, with 90 per cent rated efficiency

quarter were as follows: Region 1 (Montana, northern Idaho, northeastern Washington and northwestern South Dakota), 198,122 and $1,766,130; Region 2 (Colorado, western Wyoming, Kansas, Nebraska and South Dakota), 68,921 and $334,422; Region 3 (Arizona and New Mexico), 64,662 and $756,019; Region 4 (Utah, Nevada, southern Idaho and western Wyoming), 53,090 and $340,776; Region 5 (California), 283,339 and $4,534,675; Region 6 (Washington and Oregon), 785,717 and $12,300,411.

Region 7 (Maine, New Hampshire, Vermont, Pennsylvania, Virginia, West Virginia and Kentucky), 20,660 and $249,508; Region 8 (North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas and Tennessee), 96,323 and $2,145,997; Region 9 (North Dakota, Minnesota, Iowa, Wisconsin, Missouri, Illinois, Indiana, Ohio and Michigan), 30,439 and $203,812, and Region 10 (Alaska), 26,448 and $82,520. The respective amounts for Puerto Rico were 88 and $1,228.

St. Regis Boosts Timber Holdings

St. Regis Paper Co. has acquired forest management and timber cutting rights for a period of 60 years on a tract of 34,200 acres of long leaf and slash pine in Worth and Turner counties, Ga. The tract, located in the upper coastal plain, is approximately 150 miles northwest of the new St. Regis kraft, pulp, paper and board mill at Jacksonville, Fla.

As a result of this addition, the firm now has more than 600,000 acres of woodlands owned or under long-term management leases in the South, of which approximately 300,000 acres are within 100 miles of the Jacksonville mill. Wood from the tract will be shipped to the mill via the Southern Railway and the Seaboard Air Line Railroad. St. Regis plans to plant 2,000,000 slash pine seedlings annually during the first seven years of management.

Attorneys Granted 60 Days in Clay Patent Suit

Federal Judge Frank M. Scarlett of Brunswick, Ga., on December 29 gave attorneys 60 days to file briefs after hearing appeals from a special master's findings in a patent infringement suit involving treatment of Georgia clays for use in high-grade paper. Georgia Kaolin Co. of Dry Branch is seeking damages from Thiele Kaolin Co. of Sandersville and an injunction against its refining process.

The process involves the treatment of the clays to remove certain particles and to improve its quality for use in making high-grade papers. Both parties appealed a ruling by Special Master John Gilbert that Georgia Kaolin's patent is valid, but that Thiele was innocent of any infringement.

The suit was brought in 1949, based on a patent issued 10 years earlier to William T. Maloney, a former chemistry professor at Vanderbilt University, who developed the process.

Major Course Expansion Planned at W. Michigan

A major expansion in the paper technology curriculum at Western Michigan College, Kalamazoo, is now being planned for the fall semester. The development is based on the experiences of the last five years. Definite course patterns in two areas of study will be offered, meeting the needs of the industry in the technical-manufacturing areas and also in the sales-management areas. The announcement was made by Dr. Wynand Wichers, vice president and chairman of the curriculum committee.

A comparison of the two courses of study shows that the technical students will place their emphasis on advanced mathematics and chemistry, while the sales-management students will spend extra time in business courses. However, both will receive a full course in papermaking.

"Altogether, this program should provide a fully balanced choice for undergraduate training in the various phases of the paper industry, thus greatly increasing the number of students who will be enrolled in the course and available to industry on graduation," Dr. Alfred H. Nadelman declared recently. Dr. Nadelman is head of the paper technology curriculum.

Along with these curricular changes comes a slight change in title. Since 1948 the course has been known as pulp and paper technology, but from now on it will be known simply as paper technology. It is thought that the shorter title is broader in its connotation.

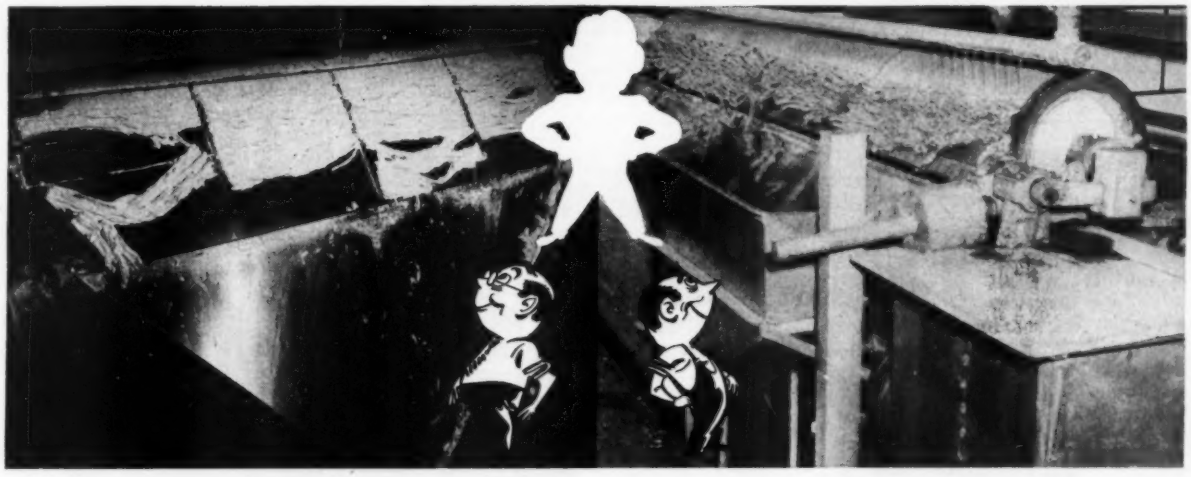
Zellerbach Sees Sound Future for Industry

With the industry operating "more sensibly" than in the past with regard to expansion, J. D. Zellerbach, president of Crown Zellerbach Corp., sees no need to fear overexpansion in the foreseeable future. Speaking recently before a meeting of the New York Society of Security Analysts, Mr. Zellerbach declared that future expansion will be slowed by the fact that there are no large stands of timber available in the United States to support new mills.

The pick-up in paper and paperboard orders that began last June is still strong

DO YOU FIT INTO

THIS HAPPY PAPERMAKING PICTURE?



Nowadays, with good papermaking stock costing what it does, watching a BIRD SAVE-ALL in operation is a mighty satisfying sight.

How about *your* stock recovery system? Is it up to date? Has it the capacity to meet today's machine output?

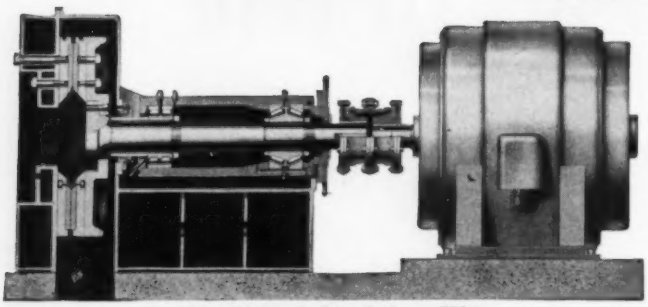
If there's any question about it get in touch with BIRD MACHINE COMPANY, South Walpole, Massachusetts, for complete information, layouts and estimates on

The BIRD SAVE-ALL

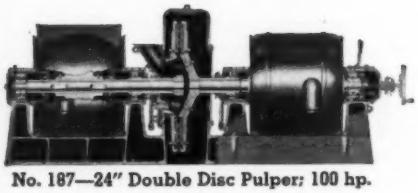
BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS

THE Bauer LINE OF DISC MACHINES

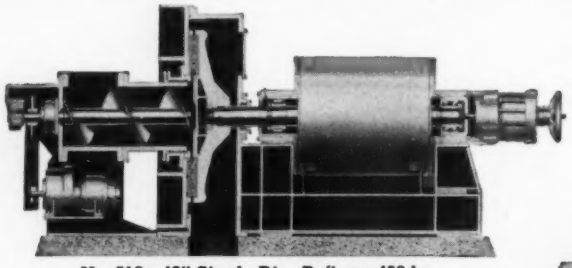
FOR THE PULP AND PAPER INDUSTRY



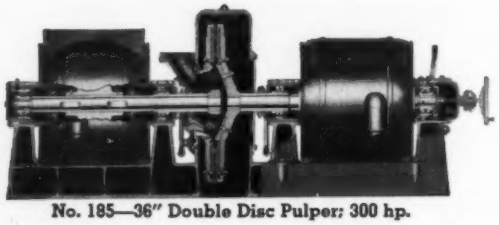
No. 430—48" Single Disc Refiner; 750 hp.



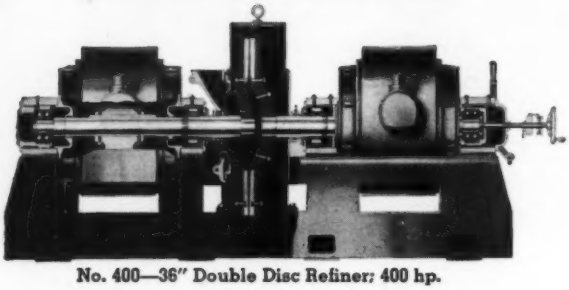
No. 187—24" Double Disc Pulper; 100 hp.



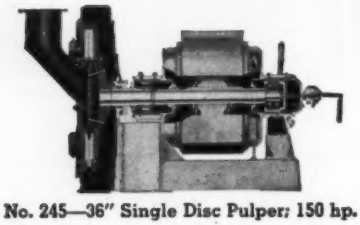
No. 510—40" Single Disc Refiner; 450 hp.



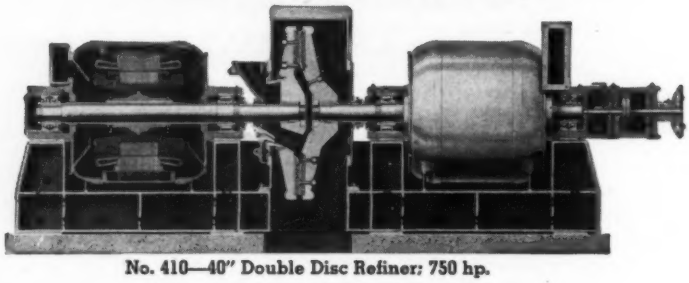
No. 185—36" Double Disc Pulper; 300 hp.



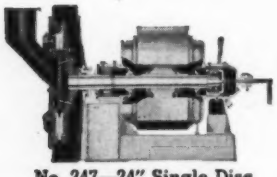
No. 400—36" Double Disc Refiner; 400 hp.



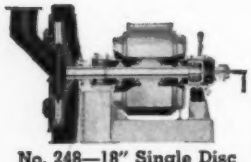
No. 245—36" Single Disc Pulper; 150 hp.



No. 410—40" Double Disc Refiner; 750 hp.



No. 247—24" Single Disc Pulper; 50 hp.



No. 248—18" Single Disc Pulper; 25 hp.

No. 148—8" Single Disc Mill; 10 hp.

Bauer ALSO BUILDS

- 4 Sizes of Double and Single Disc Attrition Mills
- A Complete Line of Hammer Mills

THE BAUER BROS. CO.

1759 SHERIDAN AVE. • SPRINGFIELD, OHIO

and should assure capacity operations of the Crown Zellerbach plants at least through the end of the April 30 fiscal year, Mr. Zellerbach continued. He said that from 1920 through 1945 paper firms expanded at a rate of just under 4 per cent—and operated in that period at 78.6 per cent of capacity.

However, since 1946 and projected through next year, the industry is expanding at the rate of 3.8 per cent, and until the end of 1951 it was running at 95 per cent of capacity. The speaker conceded that there is some evidence of overexpansion in the kraft grades, but said that demand should take up the slack in about a year.

German Activity in Colombia; New Mills in Africa and Burma

An investment of "several million dollars" is reportedly being considered by German business interests for the establishment of a pulp and paper mill in Colombia, S.A. The project—while still in the preliminary stages—might eventually include production of newsprint and kraft paper, rayon and wallboard.

A report submitted by FAO on the possibilities of making pulp and paper in Colombia preceded the news of German interest in the country. Until the report is formally accepted by the government, its contents cannot be made known. However, sources in Bogota have revealed that the Industrial Development Institute, a branch of the government, is considering three projects submitted by FAO technicians. One involves the use of sugar cane waste (bagasse) ftom Colombia's sugar mills for the manufacture of paper. The second project calls for the utilization of lumber resources in the Magdalena River Valley, while the third concerns the use of timber from the Bogota savanna.

S. *African fiberboard mill*

The new board mill near Durban, Union of South Africa, is in production. Output consists of finely processed fiberboards, with raw material consisting of Zululand-grown saligna gum trees. Since the first trial run in July 1952, it has been reported that the type of timber used and the process employed gives a finished product of a quality superior, in many respects, to similar boards produced elsewhere. At present, the product is used mainly in the building and furniture industries.

Bamboo will be used as a raw material in a pulp and paper mill reportedly being planned by the government of Burma. The mill is to produce 70 tons daily of dried and baled bleached pulp and 30 tons daily of a general line of printing and writing papers.

25-YEAR SERVICE pins are awarded to veterans of Downingtown Mfg. Co. at a recent banquet honoring long-time employees; Enright Ellis (right), president and treasurer, presents pins to Carroll H. Mullen (left) and Karl S. Snell

Sulfur Optimism Unwarranted, Consultant Tells Industry

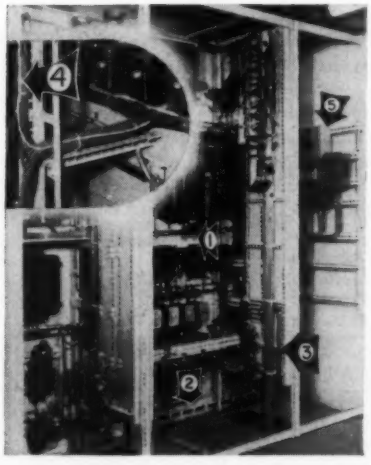
Optimism on the sulfur supply situation is unwarranted and not consistent with recently released figures of the Bureau of Mines. This is the view of S. Schwartz of S. Schwartz & Associates, a consulting engineering firm specializing in the sulfur industry. Mr. Schwartz contends that the optimism should be replaced by cautiousness and conservatism in line with a recent statement by the IMC: "the improvement in the supply position might be only of a temporary nature."

Raising the country's inventories to safe working levels from the standpoint of national defense was the primary purpose of sulfur controls, Mr. Schwartz declared. He noted that the low point in inventory was reached in August 1951 at 2,665,801 gross tons of Frasch sulfur. The high point, reached in September 1952, was 3,081,284 gross tons, an increase of approximately 315,000 tons.

Inventory of recovered sulfur has dropped consistently from January 1952 to October 1952, which is the last month for which figures are available, from 96,813 to 74,899 gross tons. "If seasonal Frasch production patterns continue as they have in the past," Mr. Schwartz went on, "the decline in Frasch process sulfur inventory will be greater during the coming months. . . . With 1952 production of Frasch sulfur estimated at 5,541,000 gross tons, consumption at current rates would consume our inventory in seven months, more or less, if the production of only two of the leading sulfur producers was stopped."

Pyrites Plant in B.C.

Columbia Cellulose Co., wholly owned subsidiary of Canadian Chemical & Cellulose Co., has put into operation its new pyrites roaster for production of sulfur dioxide gas for its pulp mill. Installation of the new equipment will reduce sharply the use of imported sulfur in pulp making operations at the



TYPICAL AUTOMATIC CONTROL panel (rear view) which, according to Bailey Meter Co. of Cleveland, incorporates the newest developments in panel design and construction; the development is the result of demands by pulp and paper engineers for more instruments at no increase in operating space or sacrifice of maintenance ease; the various advancements are (1) complete accessibility now provided through the utilization of vertical support areas; (2) control room floor openings and external tubing and wiring conduits may be completed well in advance of panel installation; (3) tubeways have been created to provide centralized distribution points; (4) wireways enclose well-marked, compact, but easily accessible electrical terminal blocks, and (5) adjustable wall racks facilitate mounting of any make control boxes, alarms, relays, breakers, etc.; in the panel shown above approximately 12 sq. ft. of additional equipment and tubing may be mounted without affecting the accessibility.

firm's Prince Rupert, B.C., mill. Previously, the sulfur dioxide was obtained by burning pure sulfur brought in from the United States.

Arrangements have been made for the delivery of a continuous supply of pyrites from Britannia Mining & Smelting Co. The pyrites are recovered in the flotation of ores at Britannia's Howe Sound operation.

Production has started at a new sulfur pyrites mine at Skorovas, Norway, which is expected to hike that country's annual output of 700,000 tons by 20 per cent. Drillings have shown that the pyrites contain 51 per cent of sulfur and 1.5 per cent of copper.

Impco Name Change Announced

Stockholders of Improved Paper Machinery Corp., Nashua, N.H., have voted to change the corporate name to Improved Machinery Inc. According to the official announcement, the action was taken "for the sake of simplicity and convenience."

The change was prompted by the fact that in recent years the range of the firm's products has taken in fields other than paper manufacturing: plastics, viscose, etc. Most of the line, in fact, is for pulp mill use. It was felt that the new name would be much more representative. However, the trade name "Impco" will continue on all products. Officers of the firm will remain the same, with Walter L. Barker chairman of the board and John P. Rich as president.

Allied Notes

Downingtown Mfg. Co.
recently obtained a contract to build a fourdrinier machine for Valmetefor Vietsiluoto O. Y. of Finland. The machine is to be the cantilevered type, with parts subject to corrosion made of stainless steel.

Rust Engineering Co.,
Pittsburgh, has reviewed its 1952 accomplishments in the pulp and paper industry. The contracting firm continued the major expansion projects of Hollingsworth & Whitney Co.; Crossett Paper Mills at Crossett, Ark.; West Virginia Pulp & Paper Co. at Covington, Va.; a southern paper firm in Alabama, as well as the $5,800,000 project of Halifax Paper Co. at Roanoke Rapids, N.C. A project doubling the daily capacity of Bird & Son's, Shreveport, La., felt mill was virtually completed; and a new $1,125,000 semichemical pulp mill begun for New York & Pennsylvania Co. at Lock Haven, Pa.

Merritt-Chapman & Scott Corp.
has located its general offices at 260 Madison Ave., New York 16, N.Y.

WORKING EXHIBITS of %Proportioneers Inc.% products are being shown throughout the United States in a new 40-foot motor trailer; the Providence, R. I., manufacturer of chemical feeding and proportioning equipment has installed 20 tons of equipment in the rolling laboratory; among the exhibits are large proportioning pumps; cities to be visited include Chicago, Denver, Seattle, San Francisco, San Diego, Amarillo, New Orleans, Nashville, and Pittsburgh

The Foxboro Co.,
Foxboro, Mass., has opened a branch office at Wichita to serve instrument users in the Kansas area.

H. M. Spencer Co.
of Holyoke, Mass., is manufacturing wire rolls for paper mills at its new Appleton, Wis., plant.

Baker-Raulang Co.,
Cleveland, has purchased Lull Mfg. Corp., Minneapolis, manufacturer of heavy-duty lift trucks, tractors, and other material handling vehicles. The Minneapolis operation will be known as Baker-Lull Corp.

Brandon Sales Inc.,
Greenville, S.C., has been incorporated with capital stock of $10,000 and will carry on a general sales agency business in supplies for paper mills.

E. A. Crawford Co.,
Providence, R.I., has been recently organized by Earl A. Crawford, formerly president of Crawford Inc., engineers and manufacturers of converting machinery and printing presses. The firm will render consulting, research and machine designing services to the graphic arts and paper converting industries.

Copes-Vulcan Division,
Continental Foundry & Machine Co., Erie, Pa., has appointed the following representatives: W. E. Veenschoten, Birmingham, Ala.; Cochrane Engineering Corp., Chicago; Pacific Steam Control Co., Seattle; Barnes Engineering Co., Indianapolis, and Gil Moore & Co., San Francisco and Los Angeles.

Insul-Mastic Corp. of America
has recently signed contracts with three southern coating applicators to represent it in that region. They are: Industrial Insulators Inc., Borger, Texas; Ozark Insulation Co. Inc., Little Rock, Ark., and Rust-Proofing Inc., Phoenix.

John Hewson Co.,
New York, N.Y., has announced the opening of a Philadelphia office in the National Bank Building, Ambler, Pa. The office will handle all field application work, sales and service for the firm's high speed static controls, high voltage dc insulation test instruments, and other high voltage electrical instruments.

Milton Roy Co.,
Philadelphia manufacturer of controlled volume pumps and automatic chemical feed systems, has announced the appointment of Tower Equipment Co. as representatives in the State of Washington.

Reliance Electric & Engineering Co.
has moved its district sales offices in both Detroit and Cleveland to larger quarters. The Detroit address is now 12326 Hamilton Ave.; that in Cleveland, 13967 Cedar Rd.

Industrial Ovens, Inc.,
Cleveland, has announced the opening of a new web coating research and development laboratory. An extensive program of research and investigation of production methods in the coating field is planned.

Monsanto Chemical Co.'s
Organic Chemicals Division, St. Louis, has announced plans for an industrial preservatives section in its development

Doors permit access to the Yankee Dryer inside the hood
Exhaust stack is of telescopic design to permit passage of crane up to Yankee Dryer area
Yankee Dryer bearings are located outside the dryer hood
Hood and exhaust system over predryers just ahead of Yankee Dryer
ROSS

ROSS *Air Systems*

at DETROIT SULPHITE PULP & PAPER CO.

the finest in air handling equipment

In keeping with the high standard of efficiency required of all equipment installed for DETROIT SULPHITE PULP & PAPER COMPANY, the ROSS Yankee Machine Hood and Air System embodies the newest features in design and operation. In addition to the features pointed out above the ROSS Air System, which is of the recirculating design, has a damper arrangement to permit adjusting the amount of recirculated and fresh air handled through the system.

We are justly proud of the important part assigned to ROSS Systems by DETROIT SULPHITE PULP & PAPER COMPANY—another of the industry's outstanding manufacturers.

ROSS RS SYSTEMS

J. O. ROSS ENGINEERING
CORPORATION
MANUFACTURERS OF AIR PROCESSING SYSTEMS
444 MADISON AVENUE NEW YORK 22, N. Y.

BOSTON • DETROIT • CHICAGO • SEATTLE • LOS ANGELES
ROSS ENGINEERING OF CANADA, LIMITED, MONTREAL, CANADA
CARRIER-ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

department. The new section will be concerned with product development in the general field of industrial preservatives, which includes the important area of wood preservation. The manager is to be Ira Hatfield, who for a time was with the U.S. Forest Products Laboratory in Madison, Wis.

Sharples Chemicals Inc.'s research department is to be integrated with the Research and Development Division of the parent company, Pennsylvania Salt Mfg. Co., Philadelphia.

Warren Steam Pump Co. Inc. is now represented in Cleveland by Process Industries Engineers Inc., Pittsburgh. Arch T. Miller, formerly with Patterson Foundry & Machine Co., E. Liverpool, Ohio, is the district manager.

Allied personalities

WALTER B. MOREHOUSE, sales manager of the Paper Chemicals Department, has been named assistant vice president of Nopco Chemical Co., Harrison, N.J. A graduate of the New York State College of Forestry at Syracuse, he is chairman of the Industrial Affiliates Committee of the Superintendents Association and a member of the Coating and the Nonfibrous Raw Materials committees of Tappi.

W. B. Morehouse

C. B. Cook

C. BRENTON COOK, vice president and a director of Elwell-Parker Electric Co., Cleveland, has announced his retirement.

JAMES M. THORNTON, assistant chief engineer in charge of development for Downingtown Mfg. Co. in the Midwest, is now associated with John V. Roslund, Downingtown representative on the West Coast.

JOHN B. HAMMETT has been named manager of Mount Hope Machinery Co., Taunton, Mass.

WALLACE DUMOND is representing Appleton Woolen Mills in the southern states. His territory includes Arkansas, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas.

INDUSTRY'S EFFORTS to meet production goals despite a tight labor supply last year stimulated the use of industrial instruments and automatic control devices; here in the Brown Instruments Division plant of Minneapolis-Honeywell Regulator Co. electronic potentiometers are calibrated and checked before shipment

CHARLES E. RIEDHAUSER has been named Midwest sales representative for H. Waterbury & Sons Co., Oriskany, N.Y. He will make his headquarters in Neenah, Wis., and will cover the states of Wisconsin, Minnesota, Illinois, Michigan, Indiana, and Ohio.

C. E. Riedhauser

C. E. Schmitz

CARL E. SCHMITZ has been named vice president in charge of sales for Crane Packing Co., Chicago.

IRA J. LIPSON, formerly comptroller, has been appointed vice president in charge of Midwest operations of E. P. Lawson Co. He will headquarter in Chicago. *WILLIAM J. COCOROS* is the new Wisconsin representative.

I. J. Lipson

W. J. Cocoros

JACKSON KEMPER has been elected vice president of H. K. Porter Co. Inc., Pittsburgh. He will continue in his present capacity as general manager of the Watson-Stillman Fittings Division, Roselle, N.J.

VOLNEY R. CROSWELL, manager of safety for the Paper Makers Chemical Department of Hercules Powder Co., has retired after 41 years' service.

OSCAR C. CORDES, vice president in charge of sales for Downingtown Mfg. Co., visited the Pioneer Division of Flintkote Co. at San Leandro, Cal., during January. He inspected a recently installed Downingtown stock preparation system.

ALAN F. SHEPARDSON has been named synthetic and resins consultant to the technical staff of Snyder Chemical Corp., Bethel, Conn.

DWIGHT A. BESSMER has been elected a vice president of Timken Roller Bearing Co. He has been serving as assistant to the president since 1950.

GEORGE W. SCHWARZ, since 1948 vice president-controller of Wyandotte Chemicals Corp., has been promoted to vice president and treasurer.

G. W. Schwarz

Dr. C. G. Veinott

DR. CYRIL G. VEINOTT, nationally known electric motor designer, has joined Reliance Electric & Engineering Co., Cleveland, as consulting engineer on ac machinery.

E. WALTER HAMMER has been appointed manager of the Industrial and Building Construction division of Merritt-Chapman & Scott Corp., New York, N.Y.

NORMAN J. ALFREJD has been appointed sales representative in the Middle West for Shelton Mfg. Co., Newark, N.J. He was formerly associated with Sherman Paper Co. and Fox Paper Co.

R. A. WILLINGANZ has been appointed head of a newly established Detroit branch office of R. S. Aries & Associtates, New York City. Mr. Willinganz, a chemical engineer formerly with Union

No birds' eyes in your rag bond when it's made with

ARMOUR CHROME HIDE GLUE!

New drying methods insure that Armour's new "gelatine" type clear chrome hide glue is free from foreign materials. This improved product contains no free grease to cause "birds' eyes" in rag bond sized with it. Armour clear chrome hide glue produces a strong, colorless protective film that improves firmness, strength, rattle, resistance to tear, erasing and folding, and prevention of feathering. Due to the fineness and uniformity of particle size, it is readily soluble. It is slightly alkaline, with a pH range of from 7.2 to 7.8.

Armour standard clear hide glue—for the same field—has a pH range of 6.8 to 7.0. Surface sizing with this fine glue makes blue print, map, chart and similar papers compatible to treatment with tanning agents.

In other fields, there are exceptional Armour adhesives, such as our special hide glue for use as a colloidal flocculant for the retention of fiber and filler. We have other glues for "on machine" creping directly from the Yankee Dryer that contribute the tacking properties necessary for softness in paper tissues. Write today for complete information and prices on Armour glues for paper making.

ARMOUR *Adhesive Division*

Armour and Company • 1355 West 31st Street • Chicago 9, Illinois
Delaware and Spring Garden Streets, Philadelphia 23, Pennsylvania
50 Farnsworth Street, Boston 10, Massachusetts
120 Broadway, New York 5, New York

Carbide & Carbon Corp. and Chrsyler Corp., will be especially concerned with the technical economic work on new processes and products.

HERBERT H. JAYNES is the new New England manager for Jenkins Bros. Previously, he was assistant Boston manager.

GEORGE CHIPLEY is now representing Conoflow Corp. in Wisconsin.

Worthington Corp. has appointed *PAUL J. FOLEY* manager of its Kansas City office and *WILLIAM M. FINE* manager of its Milwaukee branch office. Mr. Foley succeeds *W. R. KENNEDY*, who has been named a consultant to his successor.

F. E. PELTIER has assumed duties as manager of central regional engineering and service for Worthington Corp. His offices are in Cleveland. Mr. Peltier will supervise district office territories in Detroit, Cleveland, Cincinnati, Buffalo, and Pittsburgh.

Jeffrey Manufacturing Co., Columbus, Ohio, has announced the following changes in its district office personnel: *CARL VERHINE* of the Columbus office has been added to the Milwaukee sales staff; *J. A. LOWRY* has been transferred to the home office from New York, and *ELMER LONGNECKER* of the Columbus district office has gone to Detroit, replacing *ROBERT MONSARRAT*, who has been named manager of the Philadelphia district office.

PAUL R. YOPP, district sales manager of Babcock & Wilcox Co., Atlanta, Ga., has been nominated a regional vice president of The American Society of Mechanical Engineers. Since only one name is presented for each office, nomination is tantamount to election.

GEORGE J. MUNTEAN, associated with the firm since 1933, has been named assistant superintendent of the Canton, Ohio, bearing factory of Timken Roller Bearing Co.

HENRY P. BERRY has been named southern regional manager for Insul-Mastic Corp. of America. He will make his headquarters in New Orleans.

DR. A. H. GOWER has been appointed assistant district manager of the Philadelphia and Baltimore districts of the Industrial Chemicals Division of American Cyanamid Co. He was formerly a technical salesman for Industrial at the Boston office.

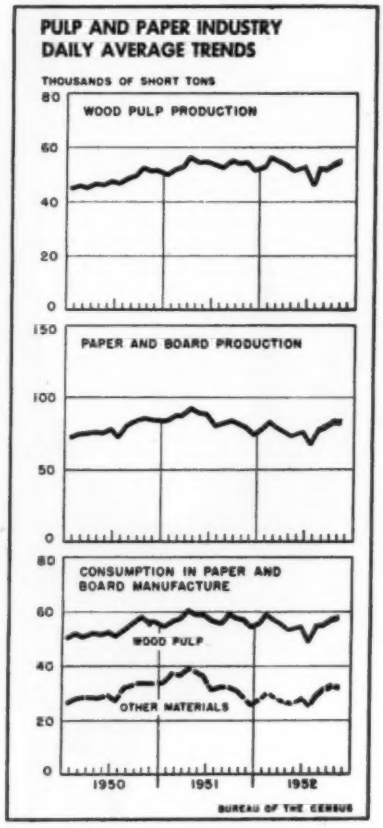
U. S. Paper and Paperboard Production

	Nov. 1952 (tons)	Oct. 1952 (tons)	Nov. 1951 (tons)	Total 1951* (1,000 tons)	Total 1946 (1,000 tons)
Paper and Board, total	2,102,146	2,279,214	2,047,543	26,086	19,278
Paper, total	885,422	946,190	990,551	11,622	8,752
Newsprint	85,956	94,302	93,246	1,106	773
Groundwood paper (uncoated)	65,017	70,018	68,052	789	776
Printing and converting (coated)	86,757	95,040	92,221	1,115	486
Book paper (uncoated)	125,598	128,685	137,711	1,622	1,447
Fine paper (writing, cover and text, bristols, thin paper and other)	98,393	111,288	122,649	1,364	1,160
Coarse paper (unbleached, kraft, glassine, greaseproof, vegetable parchment, and other)	269,137	273,935	322,080	3,597	2,690
Special industrial paper	30,666	29,192	35,204	419	272
Sanitary paper	96,081	110,524	90,709	1,215	861
Tissue paper	18,062	20,478	19,404	270	184
Absorbent paper	9,755	12,728	9,275	124	103
Paperboard, total	984,232	1,061,651	847,104	11,605	8,396
Containerboard, total	536,545	569,582	464,199	6,347	4,315
Liners	366,085	393,394	313,757	4,205	
Corrugating material	145,538	152,887	131,046	1,815	
Container chip	24,922	23,301	19,396	328	
Bending board (folding boxboard)	278,152	307,848	237,286	2,429	2,317
Non-bending board (set-up boxboard)	74,129	81,760	60,258	701	521
Cardboard	6,207	6,856	4,957	79	89
All other paperboard	89,199	95,605	80,404	2,049	1,154†
Wet machine board	11,505	13,546	9,738	144	138
Construction paper and board, total	220,987	257,827	200,150	2,716	1,992
Building paper and insulation	106,059	133,735	97,922	1,401	1,036
Hardboard and insulating board	114,928	124,092	102,228	1,315	956

(*) Preliminary report. (†) Includes bending board and non-bending board not for use in box plants. *Source: U.S. Department of Commerce.*

November Pulp, Paper and Board Production

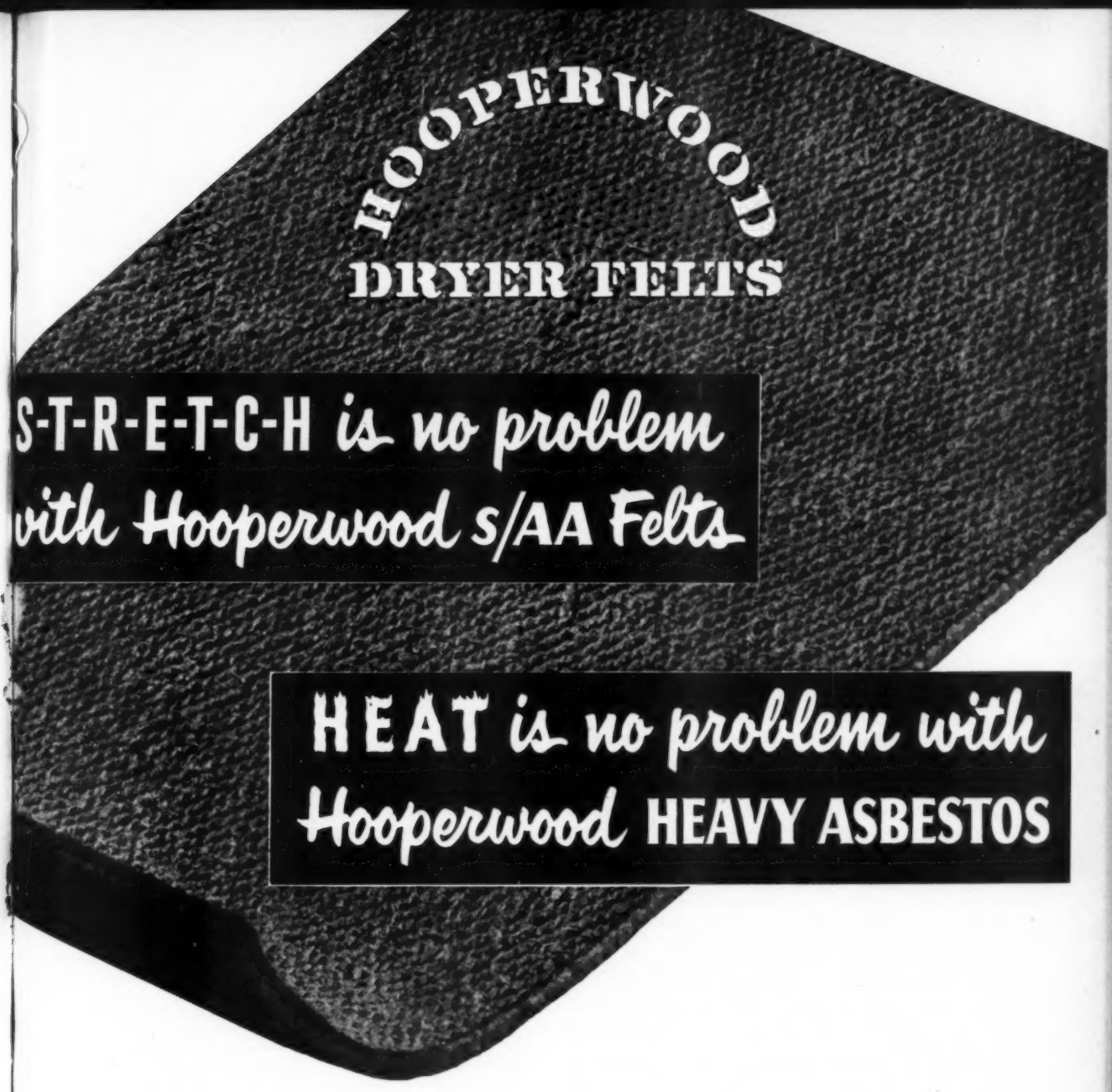
Paper and board production during November amounted to 2,102,146 tons, according to a report by the Bureau of the Census. This is an approximate 3 per cent increase over the 2,047,543 tons produced in November 1951. In terms of production base capacity, the industry operated at 77.7 per cent in November, with the paper and paperboard sections operating at 79 and 77.4 per cent, respectively. The comparable ratios for October were: Total, 78.3 per cent; paper, 78.3 per cent, and paperboard, 77.8 per cent.



Pulpwood receipts at the pulp mills during November amounted to 2,150,984 cords, with consumption at 2,224,926 cords. Month-end inventories decreased slightly to 5,842,829 cords.

Wood pulp production during November amounted to 1,387,274 tons. In terms of production base capacity, pulp production ran at 83.4 per cent, as compared to 82.2 per cent in October.

Wood pulp inventories at the end of November at the paper and board mills were 528,576 tons, as compared to 518,216 tons reported at the end of October. Month-end stocks at the pulp mills increased slightly to 143,131 tons.


HOOPERWOOD
DRYER FELTS
S-T-R-E-T-C-H is no problem with Hooperwood s/AA Felts
HEAT is no problem with Hooperwood HEAVY ASBESTOS

Hooperwood's complete NEW line of S/AA dryer felts takes the lead in meeting the challenge of present-day operating conditions. No matter how difficult your own drying problems are, there is a Hooperwood felt which will do the job BETTER.

Hooperwood heavy asbestos dryer felts are built to withstand even the excessive temperatures necessary for fast drying in modern, high-speed machines.

Besides, all Hooperwood felts have EXTRA tensile strength—and that means extra long life.

WM. E. HOOPER & SONS CO.

General Sales Offices: Juniper & Cherry Sts., Philadelphia 7 320 Broadway, New York 7 • 300 W. Adams St., Chicago 6

Hooperwood Mills: Woodberry, Baltimore 11

Nekoosa-Edwards expansion

THE CONTINUOUSLY INCREASING demand for watermarked Nekoosa bond, and the company's inability in the past to supplement its sales of the watermarked product with No. 4 bond, forced Nekoosa-Edwards Paper Co. to embark on an expansion program which recently culminated in the installation of a new Pusey & Jones Corp. paper machine.

Adam C. Remley, vice president in charge of sales, is presently executing a vigorous merchandising program. His motto is that no sale is completed until the product reaches and is accepted by the consumer. Commenting on the significance of the new machine, he said that it answers a real market requirement. The installation of the new machine, he explained, was not motivated by a mere desire on the part of the company to expand. The tremendous output capacity of southern mills producing standard heavy-volume paper grades has forced the northern mills—with their older and smaller production facilities—to concentrate on the production of higher priced specialty and quality papers. Nekoosa, originally a producer of kraft type wrapping papers, is now making high quality ledger, mimeo, duplicator, manifold Nekoosa and John Edwards bonds, as well as speciality wrapping grades such as locker paper, delicatessen paper, food tissue, and palmleaf.

Throughout the expansion program, emphasis was placed on versatile arrangement, and the installation of practical and complete equipment, without sacrificing production rates. This necessitated, among others, the addition of new digester, bleaching, and greatly stepped-up power-generating facilities. The program was under the over-all coordination and direction of Charles Reese, vice president of manufacturing.

The details of the expansion program were largely ironed out by B. L. Kassing, director of process and product development, and F. W. Wolfe of Chas. T. Main Inc., who worked closely with Pusey & Jones engineers on the design and arrangement of the machines. Pusey & Jones representatives were F. M. Sanger, chief engineer; Charles E. Hill, project engineer; and P. P. Jackson, sales engineer.

Among the Nekoosa-Edwards staff directly or indirectly associated with the expansion program are the following:

(a) Administrative: J. E. Alexander, president and general manager; N. E. Nash, vice president; S. A. Casey, secretary, and W. A. Radke, treasurer.

(b) Sales: A. C. Remley, vice president sales; C. A. Schiebler, assistant general sales manager, and T. R. Meyer, manager advertising and public relations.

(c) Manufacturing: C. H. Reese, vice president manufacturing; C. C. Parvin, general superintendent; B. L. Kassing, director of process and product development; F. H. Coldwell, manager of mill power; C. F. Watson, mill engineer; R. A. Nugent, mill operating superintendent; A. L. Sarver, paper mill superintendent; C. N. Sigvardt, mill technical superintendent, and T. A. Pascoe, technical director.

A detailed description of No. 9 machine follows on page 1346

Pulpwood supply

Under the direction of F. G. Kilp, manager of woodlands operations, the company is implementing a reforestation and forest management plan on company-owned property which now comprises an area of some 170,000 acres. This program will eventually supply the company with its total pulpwood requirements. Currently, the mills get their pulpwood from the Lake States and also from Montana.

A few years ago the company introduced a mechanized tree planter which has revolutionized planting methods. Three men can now plant 15,000 trees in the course of a single day and expect a survival rate of no less than 90 per cent of the planted seedlings. The planting stock consists of jackpine, Norway pine, white and black spruce, and balsam fir.

Machine has many novel features

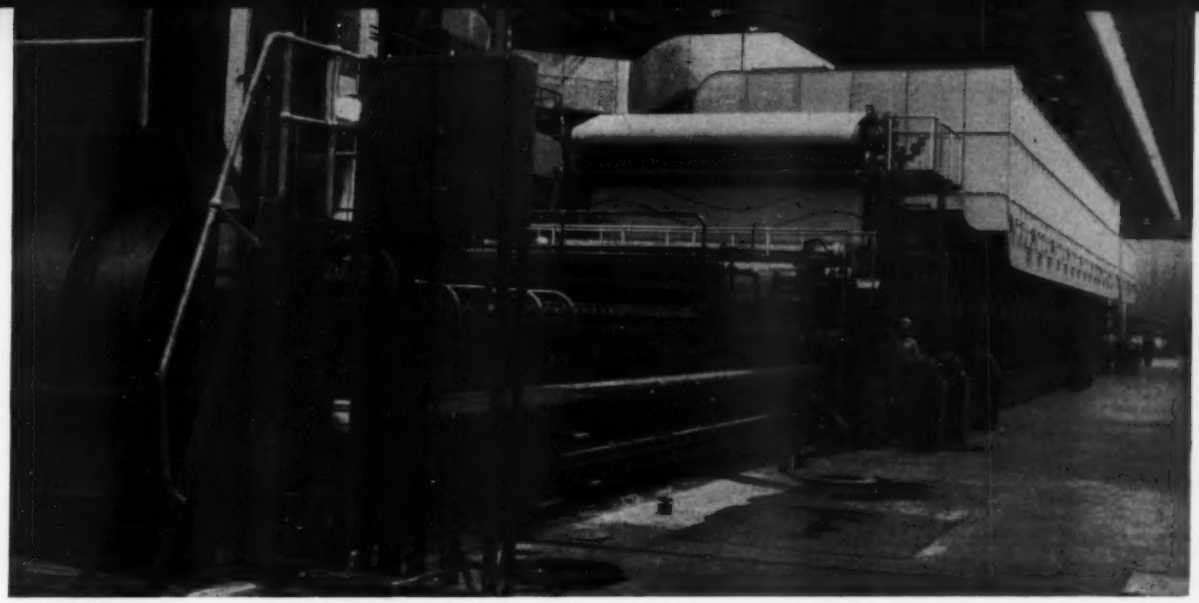
The paper machine, designed for a speed of 1,500 feet and a top daily output of 160 tons for certain paper grades, combines many unusual features and manufacturing facilities, such as:

1. The fluorescent tube lighting system, believed to be the first of its kind in the paper industry, provides for high-bay lighting and level illumination which can be adjusted to working requirements.

2. Primary refining of high consistency stock, a unique feature, is done by Mordens. They are so connected that they can be used in parallel or tandem or in any other desired combination.

3. The triple-compartmented stuff box is company-designed, permitting individual sampling and observation of each jordan discharge. It also acts as a metering device permitting flow of a constant weight of stock to the machine. The stuff box gate, with its motor-operated valve made by Shartle Bros., usually integrated as a part of the stuff box, is located in the basement.

4. The Allis-Chalmers 10,000 gal. capacity fan pump is driven by a special variable-speed V-belt drive and controlled by a



specialized Beloit water valve to insure the required accurate speed control for handling a wide range of production rates.

5. The fan pump discharges directly into an improved type Pusey & Jones flow-spreader of stainless clad steel and constructed to admit a smooth flow to the machine itself.

6. The Pusey & Jones slice equipped with perforated distributor rolls is adjustable in all directions. Both top and bottom lip and bottom slice plates are movable, and the lower slice lip may also be adjusted with relation to the breast roll while the machine is in operation.

7. The Pusey & Jones Rapi-drape fourdrinier's 85 ft. by 180 in. wire is easily changed with the aid of a Vickers hydraulic unit which lowers the breast roll and rolls out the under carriage of the fourdrinier.

8. The lump breaker roll, the draw roll, and the first return wire roll are driven by a General Electric helper driver arrangement.

9. The upper size press roll equipped with pneumatic loading and lifting controls is hung from the beams instead of being supported by a bulky stand from the floor. This arrangement insures easy accessibility in this area. A semi-circular pan made of stainless steel is located under the bottom roll.

10. The 20 in. diameter bronze shell receiving roll immediately following the size press is followed by a Mount Hope adjustable expander roll for removing wrinkles in the sheet.

11. A 1000 hp Worthington turbine drives the machine through line shaft, cone pulleys, and leather belts. The individual cone drive units have enclosed hypoid reduction gearing, each equipped with Fawick Airflex clutch and motor-operated shifters for controlling the belts on the tapered cone pulleys. Each dryer section is equipped with an air-actuated brake device to bring the dryers to a quick stop when necessary.

12. An electric helper drive, designed by Pusey & Jones, starts the dryers and accelerates them to 200 ft. a minute, after which the main clutch takes over. This saves wear on the clutch and also permits running the dryers very slowly when changing felts or ropes.

13. The dryer drives are interlocked with the Bowser lubricating system, so that the dryer cannot be started until adequate lubrication is supplied to bearings and gears. A Bowser oiling system of latest design, including heating and settling tanks and cooling system, serves all the dryer bearings, some of the dryer felt rolls, gear meshes, and driving pinion bearings.

Other Auxiliary Equipment

A 10 ft. diameter by 30 ft. chain suspended barking drum made by Fibre Making Processes.

An 88-inch 10-knife Murco chipper.

A Link-Belt chip handling system for screening, blending, storage, conveying and weighing of chips complete with instrumentation for push button control from the digester room operating floor.

Three Chicago Bridge & Iron Co. 3600 cu. ft. capacity, steel digesters complete with heaters, circulating system and Foxboro automatic digester control instrumentation.

Six lines of Impco flat screens of two 12-plate screens per line, complete with stainless steel plates and stainless steel piping.

Two Impco valveless deckers, 6 ft. 6 in. diameter by 14 ft. face.

A Dorr continuous alkali system consisting of slaker white liquor clarifier and mud washer, complete with lime feeders and instrumentation.

An 8 ft. diameter by 8 ft. face stainless steel Impco vacuum washer for installation in tile vat complete with pumps, piping and instrumentation to make up a sixth stage in the present kraft five-stage bleach plant.

A two-pass first effect Swenson Evaporator Co. vacuum evaporator body with 20 ft. stainless steel tubes.

A dust collector made by Western Precipitation Corp.

A series of soot blowers made by Diamond Power Specialty Co.

Coal handling equipment furnished by Stephens-Adamson Mfg. Co.; "Redler" vertical and horizontal conveyor, reciprocating feeder, crusher, and Syntron vibrator.

Turbine generator made by Elliott Co. 6000 kw, 0.8 pf, 3600 rpm, 400 lb., 700°F., 2300 V Delta, 30 lb. extraction pressure.

Two Worthington Corp. circulating pumps 2500 gpm double suction, centrifugal, 1200 rpm.

John E. Alexander

C. H. Reese

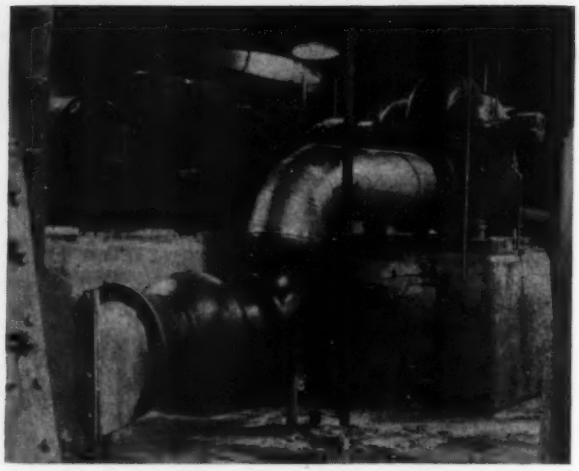
B. L. Kassing

F. H. Coldwell

R. A. Nugent

C. C. Parrin

Morden refiners at the new machine installation at Nekoosa-Edwards



New machine, showing fan pump, drive and water valve

New paper machine completes Nekoosa-Edwards program

B. L. KASSING*

THE LARGEST expansion program in the history of Nekoosa-Edwards Paper Co., Port Edwards, Wis., culminated late in December with initial production runs on the new No. 9 Pusey & Jones Corp. paper machine at the Nekoosa mill.

These runs were the first tangible results of several years of planning, building construction, and an over-all integrated production increase. This increase amounts to about 22 per cent of previous capacity and required, in addition to the new 180" machine, additional pulping, bleaching and power-production capacity.

The last phases of the program, mainly the new machine and power plant requirements, required about two years for completion. Chas. T. Main Inc., consultants, engineered the program and furnished the specialized field engineering required. Buildings were erected by C. R. Meyer & Sons Construction Co., who also handled all machine erection and millwright work. Cloverland Contracting Co. installed all piping and sheet metal work. V & M Electric Co. did all wiring and electrical equipment installation. The piping insulation was done by Asbestos Supply Co.

Paper machine building

The new machine is located adjacent and parallel to the older machines in order to maintain straight-line processing with a minimum of transportation to finishing and shipping. This required the erection of a new building above the west side of the tailrace of the hydro-electric plant.

Although this location introduced some unusual problems, it permits the building to rest on solid granite bedrock. This fact, together with the massive piers provided, assures a secure foundation without vibration. Despite being located over the tailrace, it has been possible to provide truck access to the south end of the building.

The building is 430 ft. long and 65 ft. wide and consists of a basement, operating and mezzanine floors. Maintaining the existing elevations of the older buildings provided a basement 20 ft. deep, which permitted ideal installation of equipment.

The basement walls, all floors, and the roof are reinforced concrete. The walls above the machine room floor are structural steel and brick, the inside face brick being cream-colored with a darker harmonizing wainscoating below. The ceiling is painted a high-reflectance green, this color being carried down the walls to the bottom of the roof truss line.

Windows were kept at a minimum and located only at those places where they were purely functional. Illumination is provided by fluorescent tubes arranged in lines above the crane rails. The level of illumination provided has been varied to meet the requirements of the various floor areas concerned. Fluorescent lighting was chosen because of the non-glare light quality obtained and current economy. The lighting fixtures were all supplied by Holophane Co. Inc.

The ventilation requirements are met by a modern hood embodying a unique built-in lighting system and also a special summer-cooling air distribution duct work. All incoming air is filtered and heated when necessary by otherwise wasted heat. The hot fresh air so produced is used to maintain non-sweating ceiling conditions, as well as for hot air supplied to the dryer felts. Control of the entire ventilating system is centralized in one control panel on the machine room floor.

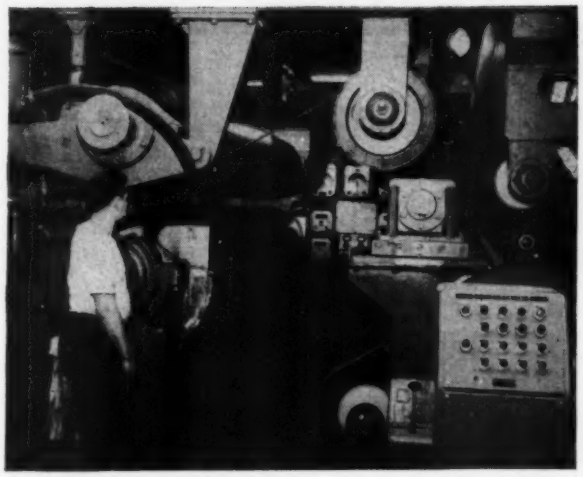
Stock preparation

Stock preparation facilities were installed in the existing stock preparation center, with only minor building alterations being required. Here, too, extremely short and direct process flow was maintained.

Two 4,000-lb. E. D. Jones & Sons Co. pulp-masters serve as pulpers, provision having been made to by-pass these units when slush pulp is used. From these units the stock is pumped to a 9,000-lb. tile-lined chest at 5.5 to 6.0 per cent consistency. This chest supplies the continuous refining equipment.

A battery of five Morden Machines Co. refiners constitutes the primary refining. These are arranged so that they may be used in any combination, either tandem or parallel. Each unit is provided with a 150 hp motor drive. The entire installa-

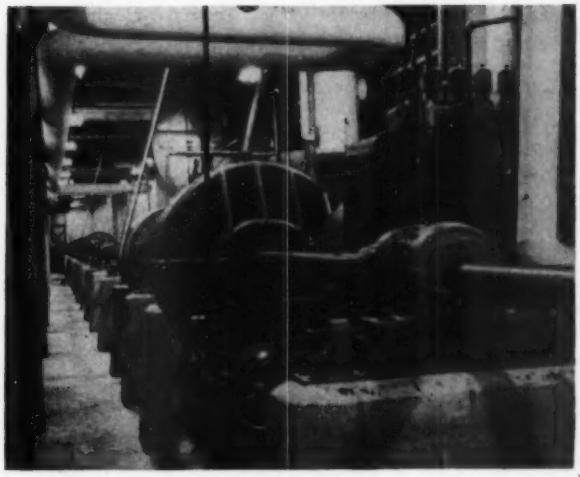
*Director of Process and Product Development, Nekoosa-Edwards Paper Co.



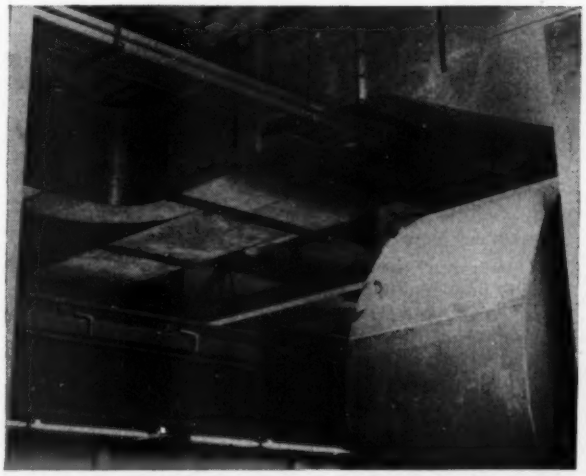
Size press on the No. 9 machine at Nekoosa

Back side of dryers incorporated in the new machine at Nekoosa

Drive turbine and line shaft of Nekoosa's new machine



Dryer drive for Nekoosa-Edwards Paper Co.'s new No. 9 machine



Duct work for roof heating from Briner economizer showing anemostats, controls and sprinkler system

Duct work for Briner system supplying heated air to dry machine felts

tion is extremely compact and versatile. High-consistency refining is a unique feature of this installation.

Provision is made to size and color continuously, these materials being introduced through Rotameters at the suction of the pump supplying the Mordens. Thus, the refiners also serve to mix and distribute these materials uniformly in the furnish while still at high consistency. Alum is added at the discharge of the Mordens, so that all primary refining is carried out under a neutral or slightly alkaline condition.

From the Mordens the stock discharges to a double compartment dilution chest, the first compartment of which merely provides a retention period for interaction of size, color, and alum while still at high consistency. White water is introduced in the second compartment to bring the consistency down to approximately 4 per cent. This preliminary dilution is provided to minimize final dilution requirements and simplify consistency control.

Leaving the dilution chest, the stock passes through a DeZurik Shower Co. consistency regulator, arranged to deliver to either or both of two machine chests at 3 per cent consistency. White water for dilution required is introduced at the dilution chest pump suction.

From the machine chest the stock is pumped to three Noble & Wood Machine Co. jordans, where any final treatment is secured at such a point that final adjustment may be made immediately at the machine. These units are supplied by a common header, but each has a separate discharge. Jordans are arranged in parallel and valved so that either may be taken from service. The jordans discharge into a stuff-box of special design.

Stuff-box and machine chests

The stuff-box is so compartmented that each jordan discharge may be sampled and visually observed. These flows are then combined in a constant level compartment from which the machine requirements are metered. The overflow returns to the machine chest pump suction. An important feature of this stuff-box design is its lack of cascading and consequent entrainment of air.

The stuff-gate, which is remote-controlled both from the machine tender's station and the backtender's weigh-sheet table, is a special Shartle Bros. Machine Co. valve located practically at the pump which delivers the diluted stock to the Nichols Engineering & Research Corp. Vortraps. At this pump the stock is combined with white water from the machine in the quantity required to satisfy the Vortrap requirements.

Dirt removal

Screens have been eliminated, and all cleaning is effected by Vortraps and Bird Machine Co. Dirtecs. The primary system is a battery of Vortraps which discharge the accepted stock into a well which supplies the fan pump. The rejected stock passes to a small tank, which supplies the secondary cleaning system, consisting of two double Dirtecs. Accepted stock from this secondary system is returned to the suction of the Vortrap pump, so that it again passes through the entire cleaning equipment.

White water system

The fan pump and machine require some additional water, this being automatically furnished by gravity in requisite volume from the white water system itself.

All white water is received in and distributed from a specially designed wire pit arranged for deaeration of the water before returning to the process. Individual pumps deliver from this pit to the various points of usage; the system being so designed that the requirements of one point cannot affect the supply to any other.

The fan pump is a 10,000 gpm Allis-Chalmers Mfg. Co. unit driven by a variable speed drive. As mentioned, it takes its supply from the fan pump well. This pump is so located that its discharge is on the center line of the machine, minimizing turbulence and eddies which might otherwise be reflected in the flow to the wire.

The discharge from the fan pump is controlled by a Beloit Iron Works streamlined valve which is operated from the machine floor. This valve discharges into the flow spreader and is especially constructed to assure a smooth flow to the machine itself.

General specifications of the machine

The machine is designed for a top speed of 1500 fpm and will trim 170 in. All rolls are dynamically balanced. A rope carrier takes the paper from the press to the calender. The speed range of the machine is from 400 ft. up to the maximum. All bearings are anti-friction of proper type and design for the service. Pneumatic cylinders or diaphragms are employed wherever indicated for raising and lowering press rolls, wire tension, and such service. A novel dual photoelectric cell break-signal has been provided so that breaks can be caught before they spread completely across the sheet.

Flow spreader and slice

With the exception of the reel and winder, the machine and drive is made by Pusey & Jones. The flow spreader, which receives the stock from the fan pump, is an upward flow spreader integrally combined with the slice.

The slice, which is of the gravity type, is completely adjustable to permit pressure formation if desired. The flow spreader-slice design, which essentially eliminates the headbox, is entirely stainless steel lined and produces a smooth uniform flow to the wire.

The fourdrinier

The fourdrinier takes a wire 85 ft. by 180 in. wide and has a level table with guide on the return wire to permit greatest possible water removal area. Non-corrosive construction has been used throughout, including eight suction boxes. The couch roll, 36 in. in diameter, is a dual box unit made by Downingtown Mfg. Co. Two shake heads are installed, both completely adjustable while running.

The Rapi-drape fourdrinier permits easy wire changing without disturbing any part of the unit. Even the couch roll is hung from the stationary side beams, eliminating the usual cantilevered arrangement at the back of the couch. The breast roll is lowered and raised by a Vickers Inc. oil pump and special hydromotors made by Bonnot Co. This high-pressure oil system also furnishes power to the couch jack and the winch arrangement required to roll the under carriage of the fourdrinier into the aisle when putting on a wire.

Wire tension is pneumatically controlled to any predetermined amount and may be altered or adjusted at any time. Suction boxes oscillate, if desired, and the white water discharged from the boxes is returned to the system after passing through an air separator.

A General Electric Co. helper drive is employed to drive the lump-breaker roll, pit roll, and draw roll. This relieves the wire and sheet of driving these rolls and automatically synchronizes the speed with that of the wire itself.

Presses

Three presses are employed, the first being equipped with Downingtown suction rolls; the third press being a plain reverse press. All paper rolls are driven at paper speed, and Bird Vickery conditioners are installed on the felts.

The top rolls are Stonite covered by Stowe-Woodward Inc. and equipped with Lodding Engineering Co. doctors electrically oscillated. The top rolls are 28 in. in diameter, and the bottom rolls are 30 in. in diameter. All top rolls are interchangeable with each other, and all bottom rolls are interchangeable with each other. The top rolls are raised, lowered and weighted by air cylinders.

Dryers

The dryers are arranged in three sections, two ahead of the size press and one following this press. Each of these sections is individually driven and has its own felt dryers. There are 36 paper dryers and 12 felt dryers ahead of the size press, all being 5 ft. in diameter. The dryer section after the size press consists of fourteen 4-foot dryers and two felt dryers, this smaller diameter having been chosen in order to have more units and thus more flexible control after the size press. Each dryer section has its own felt with automatic electrically operated felt tension control.

All dryers are driven through enclosed gearing, running in oil, and supplied with rotating condensate syphon for condensate removal from the dryers.

The size press has rolls interchangeable with the other presses and is of most modern design, the top roll being suspended from beams rather than supported by stands. It is followed by a 20-in. receiving roll and a Mount Hope Machinery Co. expander roll.

Calender, reel and winder

The calender consists of eight rolls with a 30-in. bottom roll. All rolls are on anti-friction bearings. Pneumatic cylinders supply extra pressure if needed. The Lodding flexible doctors are hydraulically oscillated.

The reel was built by Beloit and provides center-winding features when desired.

A Cameron Machine Co. winder completes the machine itself, this being driven by a Reliance Electric & Engineering Co. dc motor and speed control. The winder operates at 4,000 fpm and uses a belt drive on the rider roll. All rolls are equipped with pneumatic brakes, as is the constant-tension unwinding unit. The finished paper roll is mechanically ejected from the winder to a hydraulically raised and lowered table.

A shaft puller, made by Beloit, is used to pull the shaft from the finished roll. The rolls of paper are then rolled off the table onto a Toledo scale.

Reversing the motion of the shaft puller makes it possible to dress the shaft with new cores on the table, without handling the shaft itself. After the table is elevated to the proper height, the shaft is rolled back into the winder without effort on the part of the operators.

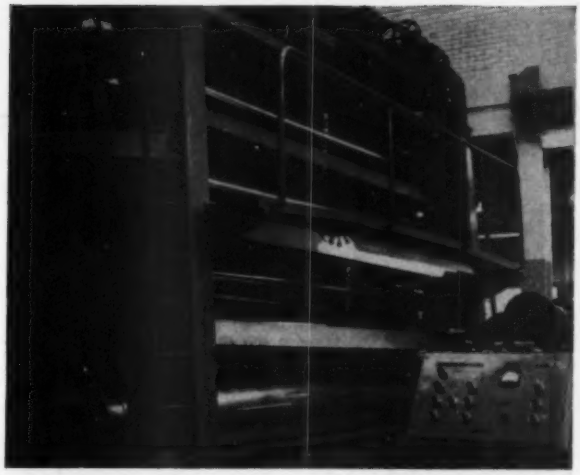
The drive

Each section of the machine is driven by a hypoid unit, Federal Fawick Corporation Airflex clutch, cone pulleys and leather belts. Special drives have been developed to answer the special requirements of the dryers. The basement line shaft is driven by a 1,000 hp Worthington Corp. turbine. Line shaft pulleys have a mean diameter of 45 in. with faces varying from 36 to 60 in. Driver pulleys have a mean diameter of 36 in. Belt speeds in all cases are well under 6,000 fpm. Each belt is provided with a motor-driven belt shifter.

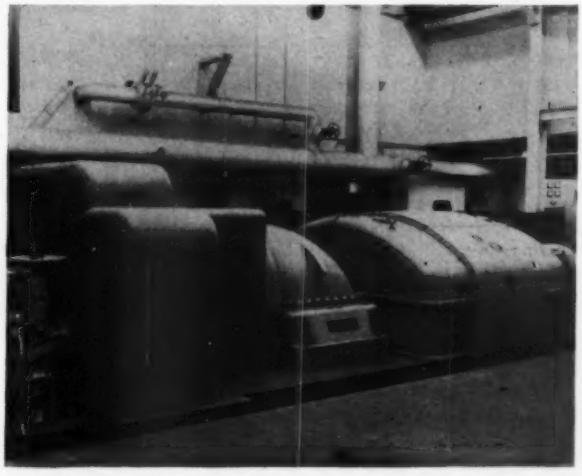
The dryer drives are especially interesting because of the electric starting drive which has been installed and the interlocks which prevent abuse and make methodical and safe procedures certain. Actually, each dryer drive includes three Airflex clutches, one for starting, one for running, and one for a brake when stopping the dryers.

These drives are so safeguarded that dryers cannot be started until the lubricating system is in operation. When oil is flowing, the starting clutch can be engaged and the dryers brought up to about 200 fpm by means of the starting motor. At this speed the running clutch can be engaged, and at the same time the starting clutch disengages and its motor stops. In stopping the brake cannot be engaged without opening the running clutch.

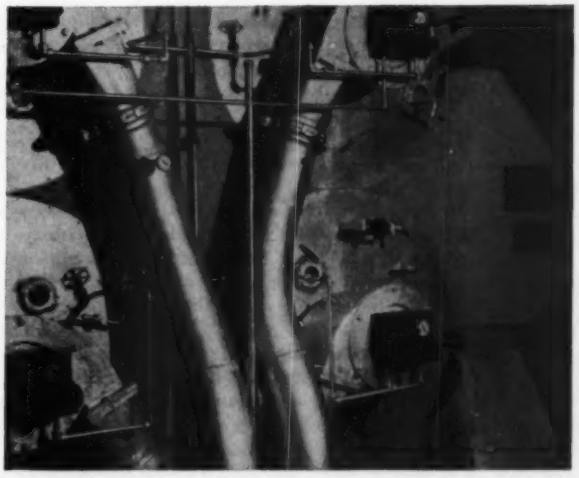
This arrangement provides great protection for the clutch in starting the dryers and makes possible slow operation when



Lodding oscillating doctors used on calender stack at Nekoosa



New 6,000 kw Elliott turbo-generator at Nekoosa's new machine



Combustion Engineering VU boiler for pulverized coal firing, 110,000 lb. steam per hour

Nursery No. 5, which boasts 9,000,000 trees, principally Norway and white pine, Norway and white spruce, and balsam fir

running on ropes or felts or whenever required to inch the dryers for any purpose.

Lubrication

As mentioned, all bearings are anti-friction and, with the exception of dryers and calenders, are fitted for periodic greasing. The dryers and calender sections, however, are continuously supplied with oil, each section having its separate Bowser Inc. system.

Essentially, the two systems are the same, differing mainly in size. The dryer system which takes care of all gears and bearings in the dryer section holds nearly 8,000 gal., while the calender unit holds only 500 gal.

These systems consist of a tank arranged to settle out water and other impurities. This tank is provided with a heating coil for use if required to assist in impurity separation. A second tank contains filters and a clean oil compartment which supply the pumps which deliver a continuous bath of oil when needed. This supply to the machine itself may be cooled if necessary.

Each point of lubrication is fitted with a sight glass. In the dryer sections all back-side bearings drain into the gear casing, thence to a header and back to the settling tank. Dryer and calender bearings are all equipped with a Lucite cover so that the supply and behavior of the oil in the bearing may be observed while running.

As mentioned previously, an interlock prevents starting the dryers before the oil supply has been turned on. A system of alarms is arranged so that any unusual pressure change or clogging of the filter is immediately signaled to the operators.

Auxiliary equipment

All stock pumps, except one DeLaval Steam Turbine Co. pump on the broke service, were supplied by Warren Steam Pump Co. All are all-bronze construction throughout, with anti-friction bearings and fast couplings for direct connections.

The fan pump is a 20-in. Allis-Chalmers double suction pump, driven by a variable pitch V-belt drive. This drive is necessary to satisfy the extreme variability required at this point.

White water pumps are made by Goulds Pumps Inc. and Worthington. All are directly connected to motors through fast couplings. The vacuum pumps were all supplied by Nash Engineering Co. and sized according to the service; each is V-belt driven.

Motors of 200 hp or above are 2200 V, with smaller units at 440 V. All motors were built by General Electric, with the exception of the dc unit at the winder, which was supplied by Reliance. The large switchgear is largely Westinghouse Electric Corp., with smaller units supplied by Cutler-Hammer Inc.

All process piping is stainless steel fabricated by Tri-Clover Machine Co. Wherever feasible, a quick opening Marmon clamp has been substituted for conventional joints, making inspection and cleaning quick and easy.

Stock valves are mainly supplied by the Fabri-Valve Co. of America, and all are of stainless steel. Water valves are by Crane Co.; the valving at the Vortraps having been supplied by DeZurik, who also supplied a number of remote controlled valves for various services.

Suction press rolls were covered by Manhattan Rubber Mfg. Div., Raybestos-Manhattan Inc. All other coverings were supplied by Stowe-Woodward.

The machine room is serviced by a Harnischfeger Corp. crane of 15-ton capacity. The reel and winder requirements are met by a hoist of 7-ton capacity manufactured by Wright Hoist Div., American Chain & Cable Co.

Dry broke falls through broke slots at the calender and reel into a Jones Pulpmaster. This unit also receives the winder shaving and miscellaneous dry broke.

After pulping the broke returns to the Morden chest, picking up any couch broke on its return. This system eventually will become the heart of a plantwide broke-handling system.

Dryer control

Stamm drying controls furnish the steam control condensate removal system and also provide moisture control for the dryer sections. This system also provides graduated temperatures for the wet end dryers with adjustable gradient as desired.

In the main dryer bank, steam enters a blow-through section and passes to a condensing section, which is evacuated by a vacuum pump. The graduated temperature section is supplied with 35 lb. steam under such conditions that it is normally below atmospheric pressure. Preset regulators insure evacuation at all times.

The dryer section after the size press is unique in that the bottom and top dryers are independently regulated for temperature conditions and drying rates.

Operating controls

All operating controls have been grouped according to use frequency in special panels built by Paul Morrow Co. of Wilmington, Del. Such controls as are used frequently are built into small operating consoles so located that the response can be observed in the controlled unit; this includes clutches, felt tighteners, belt shifters and similar controls.

All controls, such as pumps used only occasionally, have been grouped at wall panels where they are conveniently accessible. Mason-Neilan press loading stations have been combined with these panels.

Some controls, such as the fan pump speed and water-valve positioner, are operated from the fourdrinier footboard so that the machine tender can observe the results of any adjustment without moving from his point of observation.

It is also interesting that the backtender can make minor weight adjustments from his station at the reel, eliminating time loss required to notify the machine tender when such adjustment is necessary. It is also of interest that the machine tender, backtender, and engineer are provided with means of telephone communication with each other.

Drying and ventilating controls were supplied by Taylor Instrument Cos. The general processing controls were supplied by Foxboro, this including all liquid level recorders, vacuum recorders, and similar services.

Machine speed is indicated at the wet end and recorded at the dry end by Bristol instruments; the recording tachometer is also equipped to indicate all interruptions to production. All flow controls, steam or water, are supplied by Bailey.

Job evaluation . . .

—top management's role and responsibilities

Part 2 of a series

The next article, which will appear in the March issue, will cover selection of Job Evaluation plans

J. A. KELLER*

FORWARD-LOOKING TOP MANAGEMENT of successful companies having harmonious employee relations know the importance of equity in compensation at all levels of employees—supervisory, clerical, technical, and shop. The prevention of disharmony and the promotion of a feeling of fairness and well being among all levels of employees is a top management job. The maintenance of relations with employees under existing policy can be delegated. The initiation of new programs and the improvement in employee relations or the *reverse* must be credited to top management. The decision to undertake a job evaluation program, whether in the office or in the shop, must be made by top management, and it must also lend leadership and stimulus to the program.

Once the decision is made to institute a job evaluation program, it is necessary for top management to define the policies under which it will be installed and operated, as a job evaluation program must be planned in advance and carried out in a series of logical steps.

Management's duties

Top management must define the company's wage and salary policy and what it wants to get out of job evaluation:

—Will the company use the salary levels as the basis for paying people on the jobs?

—If so, what action is to be taken about people whose salaries are above or below the ranges that come out of the program?

a. The people *below* the minimum should be raised *to* the minimum.
b. However, people above maximum should not have their salaries cut.

—Where does the company want its salaries to be in relation to the area? At or above the area is almost always the best.

—Who in the organization is to be responsible for evaluating the jobs and setting wages or salaries?

—How are wages or salaries to be controlled? Who is to recommend raises, who needs to approve them, and what should be the usual frequency of salary review?

Let the employees know.

—Unannounced or secret evaluations rarely stay alive.

—An open program has many advantages:

a. Employees are pleased that the company wants the right wage structure.
b. They are reassured about the implications of job analysis.
c. All concerned are more willing to live within the final structure.

—How to announce the program:

a. By bulletin or in the house organ.
b. By a meeting.
c. By a letter to each employee.

—The announcement should come from top management.

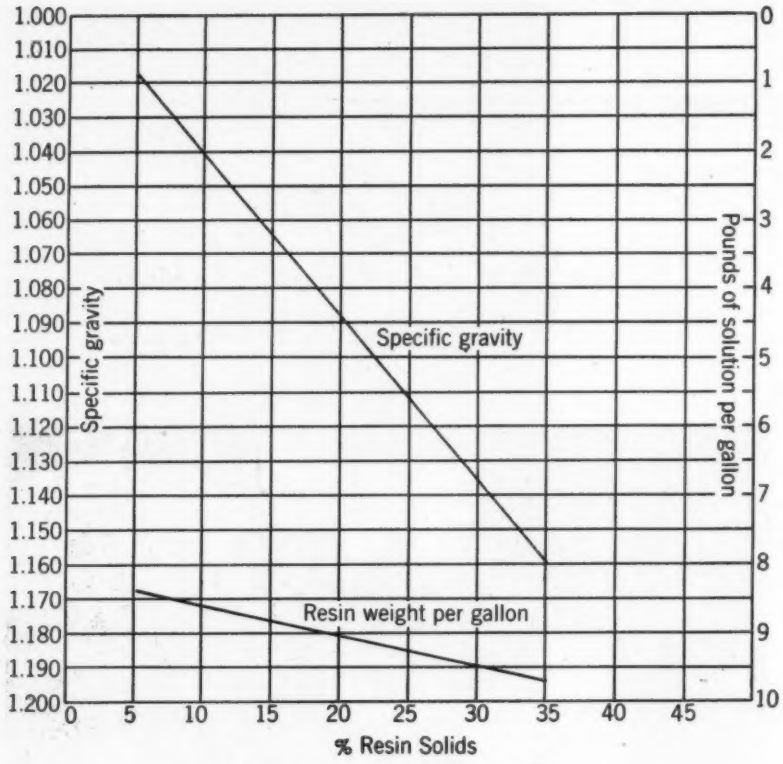
Responsibility

Even before the selection of the type of plan or the attainment of union agreement (if the union is involved, before specifying the detailed procedures involved in evaluating job worth and administering the result), it can be seen that much needs to be done, and the responsibility for doing it must rest with those who make company policy. How then can anyone but top management make a decision to institute a program of job evaluation?

There are many misjudgments and misconceptions attached by some business managements to the effects of a job evaluation program. One is that the job evaluation program just results in increased wages. This is not the case as, when properly installed, a job evaluation program only increases wages where inequities exist and always results in better employee-management relationship.

When the customer buys paper products, he insists that the price he pays fairly represents the worth of the product. How then can managements of paper products industries expect to get efficient and high quality performance from their employees without using an objective measure of job worth—that technique *is* job evaluation!

*Vice president, George Fry & Associates, consulting management engineers, Chicago and New York, N. Y.



Weight vs. Uformite 711 Solids

This is the first in a series of articles on the application of resins in the pulp and paper industry

New urea formaldehyde resins for wet strength

THE INTRODUCTION OF a number of urea formaldehyde type resins has been a most significant development in recent years. Wet strength resins first came into prominence in the early 1940s. Within a decade, they were accepted by the pulp and paper industry. In many paper applications wet strength properties have become a must, and while in most paper grades wet strength is desirable, economic considerations rule against it under present conditions. The search for lower-cost but highly effective wet strength resins therefore continues, since there are many paper grades that would benefit greatly from improved wet strength if such properties could be imparted more economically.

The first urea formaldehyde resins used to impart wet strength were anionic in character, i.e., they carried a negative charge. Deposition on the pulp was achieved by the use of alum as a mordant.

Continued research efforts then produced cationic resins, carrying a positive charge. These permitted the use of acids as well as alum for adjusting the pH in the stock mixture and depositing the resin on the negatively charged fiber.

Both anionic and cationic urea formaldehyde resins are used extensively today in paper manufacturing. These resins can be added at any point from the beater to the wire, no special equipment being required. Moreover, broke or trim from the paper machine can be repulped readily, since the development of wet strength imparted by urea formaldehyde resins is not immediate but may, in some cases, require several weeks for maximum development. Delayed wet strength development is an important property of urea formaldehyde resins and distinguishes them from the melamine resins, which also found their first extensive use in the paper industry in the early 1940s. Melamine resins produce rapid off-the-machine wet strength, which is an advantage if the paper is to be used immediately but presents difficulties in connection with broke recovery. Apart from this disadvantage, the preparation of the melamine colloid requires a pretreatment with acid which is followed by an aging process.

The melamine resins, despite the above disadvantages, attained great popularity with papermakers because of their high degree of wet strength when compared with that of the earlier types of urea formaldehyde resins.

The relatively low wet strength of the early urea formaldehyde resins has been overcome with the development of radically modified cationic urea formaldehyde resins. The most recent among these is Uformite 711, developed in the Rohm & Haas Co. laboratories. In addition to combining most of the properties desired in a wet strength resin,

Performance of Uformite 700 in Various Finishes

Basis Weight	Resin Solids on Pulp Solids	Wet Tensile Off-machine	Wet Tensile Accel. Aging 30 Min. 105° C.	Wet Tensile—Natural Aging 7 Days	Wet Tensile—Natural Aging 28 Days
UNBLEACHED KRAFT					
50 lb.	2% Uformite 700	9.1	15.8	12.0	15.0
	2% Melamine	8.8	11.0	9.5	10.7
20 lb.	0.4% Uformite 700	4.2	6.1	5.2	5.7
	0.53% Uformite 700	6.0	7.6	6.2	7.0
	0.40% Melamine	3.6	5.6	5.5	5.5
60 lb.	2% Uformite 700	14.7	20.0	...	18.8
	2% Melamine	14.4	17.5	...	15.2
150 lb.	2% Uformite 700	15.0	21.8	18.0	22.0
	2% Melamine	16.0	21.9	18.4	21.8
BLEACHED KRAFT					
40 lb.	1% Uformite 700	6.6	8.8	8.2	8.4
	1% Melamine	7.0	8.5	7.7	8.0
BLUE PRINT (50% RAG)					
....	1% Uformite 700	6.2	8.4	8.3	8.3
	1% Melamine	6.3	8.8	8.0	8.0

Uformite 711 is said to improve dry tensile strength, Mullen, fold, and pick resistance.

Its physical properties are listed by the manufacturer as follows:

Solids, 35 per cent;
Viscosity at 25° C. (Gardner-Holdt) —D-F
pH, 7.5—8.5;
Specific gravity 25° C.—1.155-1.162;
Appearance—Clear;
Color—light straw, and
Water dilutibility—infinite.

Recently developed urea formaldehyde resins are effective with all types of pulp and can be used with bleached or unbleached kraft or sulfite as well as sulfite-groundwood blends. They are most effective if added in the headbox, but good results are obtained when added as far back in the paper manufacturing cycle as the beater. In order of preference, addition is recommended at (1) the consistency regulator, (2) fan pump, or (3) at the discharge of the last jordan. In beater addition, the resin should be added as near as possible to the end of the beating cycle. The quantity of resin used varies between 0.23 to 3.00 per cent resin solids on a bone-dry pulp basis.

Characteristics

Urea formaldehyde resins show good stability. They may be stored in bulk with a satisfactory margin of safety. In the case of Uformite 711, stability tests are incomplete but useful life in excess of three months is anticipated at temperatures of 75°—95° F.

For pH adjustment, alum, hydrochloric acid, or sulfuric acid can be used. Under normal papermaking conditions, sufficient acid should be added to obtain an optimum pH of 4.5 to 5.0 at the white water. Alum or acid is conveniently added at the beater, and the desired pH at the wire is maintained by constant further addition of either acid or alum at the fan pump.

The cure of these resins is initiated at the temperature of the drying rolls. It will then proceed and come to completion in the storage or finishing room at room temperature of about 75° F. The higher the temperature of the dryer rolls, the higher is the wet strength immediately off-the-machine.

An important property of the urea formaldehyde resins is their non-sensitivity to sulfate ion concentration. In practice it has been found that the presence of sulfate ion actually tends to improve their performance. The presence of residual bleaching agents also does not seem to impair the resins' effectiveness.

Effect of Sulfate Ion Concentration on Resin Performance

Wet Tensile Strength—Pounds Per Inch Width					
SO_4	Alum	Uformite 700 7 Days	Uformite 700 28 Days	Melamine 7 Days	Melamine 28 Days
0	0	3.1	4.6	4.1	4.7
0	3	3.8	5.1	3.9	4.4
500	3	4.3	5.5	2.5	2.7
1000	3	4.1	5.4	2.0	2.3
2500	3	3.4	4.6	1.6	1.5

Applications

Boxboard manufacturers will be interested to learn of the successful production of an all-jute board, which is consistently meeting government specification for weatherproof boxboard. By fortifying the jute board with some of the latest type urea formaldehyde resin, an all-jute board was produced which met all government specifications, the added cost of the resin being offset in large measure by more or less complete elimination of rejects.

This urea formaldehyde treatment increased the average wet burst factor of the board from 18, for the untreated jute linerboard, to 45 for the treated linerboard. When two outer plies of the treated jute linerboard were laminated with inner plies of untreated board, the wet Mullen values were shown to be 40 to 70 pounds higher than those obtainable with untreated board.

Production Figures

Recent types of urea formaldehyde resins are now in full commercial production and find use for such applications as Army map paper, sulfite toweling, glassine, linerboard, twisting tissue, heavy-duty multi-wall bags and various types of reproduction paper.

An estimate made by Hercules Powder Company, one of the major producers of urea formaldehyde resins, shows an annual production of 15,000,000 lb. (on a dry basis) of wet strength type urea formaldehyde resins. Of this quantity, 13,000,000 to 14,000,000 lb. are used in papermaking; while 1,000,000 lb. are consumed by the paper conversion industry, largely for insolubilization of starch adhesives.

About 9 per cent of the output is used for internal treatment of paper and 1 per cent for surface treatment.

Bursting Factors For Jute Board

Sample No.	Percent Uformite 700	Direction of Test	Wet Bursting Factor Minimum	Wet Bursting Factor Maximum
1	None	Face-to-back	22	25
		Back-to-face	20	25
2	None	Face-to-back	17	24
		Back-to-face	16	23
3	None	Face-to-back	19	24
		Back-to-face	19	25
4	None	Face-to-back	22	24
		Back-to-face	22	24
5	2% Uformite 700 in top cylinder	Face-to-back	25	33
		Back-to-face	41	44
6	Same	Face-to-back	33	36
		Back-to-face	47	58
7	Same	Face-to-back	32	37
		Back-to-face	45	53
8	Same	Face-to-back	36	40
		Back-to-face	50	62
9	Same	Face-to-back	26	33
		Back-to-face	40	45
10	None	Face-to-back	20	25
		Back-to-face	22	25
11	None	Face-to-back	22	25
		Back-to-face	20	25

X-ray calculator for identifying elements

V. W. PALEN*

THIS CALCULATOR was designed by the author and is being published exclusively by this magazine for X-ray spectrograph (fluorescence analysis) users in the paper field.

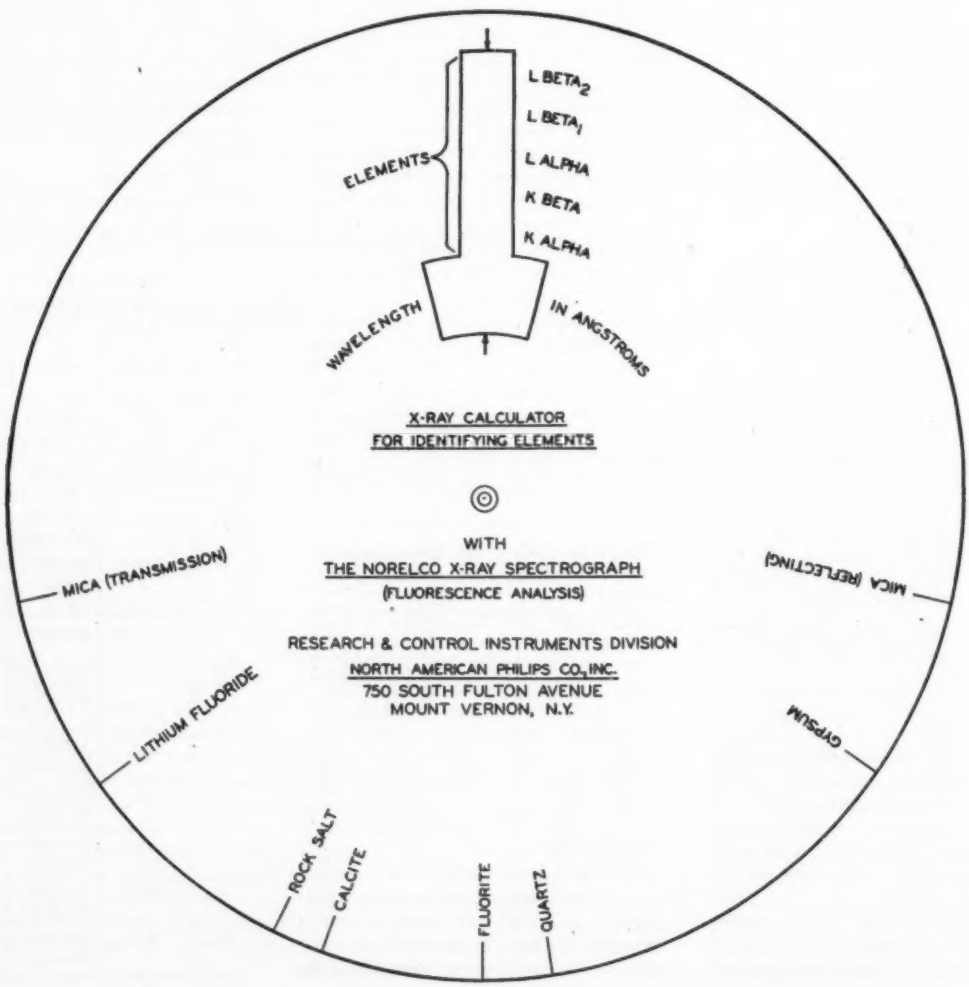
To assemble the calculator, mount the two circular discs on cardboard with rubber cement, then use a razor blade to cut out the windows for elements and wave lengths. Accurately punch holes at the disc center and use a small nut and bolt with washers to hold the assembly together. Tighten the nut so the discs rotate freely, then solder or rivet the bolt for permanence.

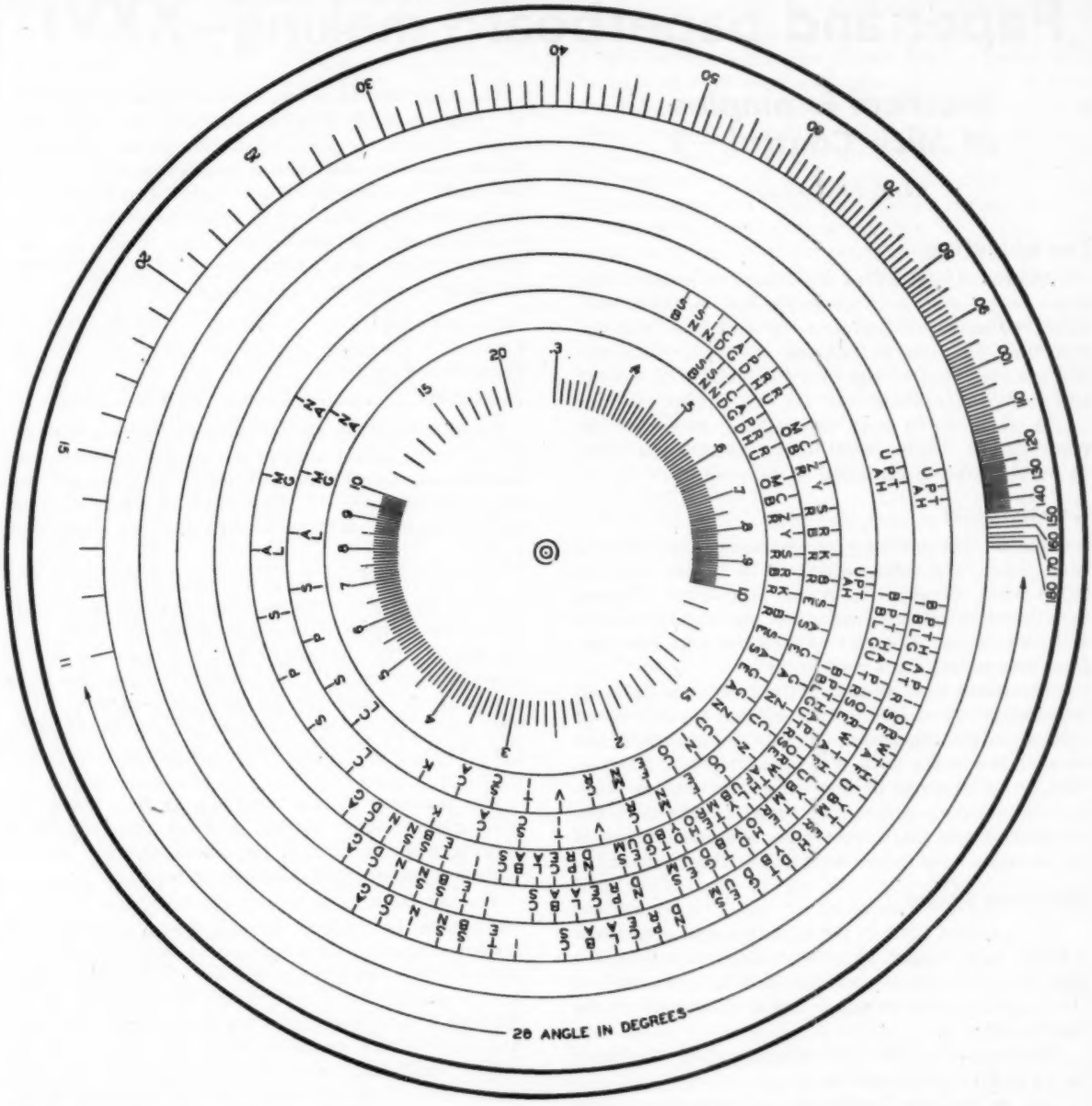
In use, the X-ray spectrograph identifies an element in a given specimen by means of a recorded intensity reading on a strip-chart. The intensity readings appear as peaks on a hill-and-valley curve the horizontal axis of which is graduated in degrees. Angular location of the peaks is the means for identifying elements from Sodium (atomic No. 11) to Uranium (atomic No. 92).

Various analyzing crystals and groups of X-ray intensities may be used in X-ray spectrograph analysis work. The choice for a particular job depends on the nature of the problem at hand. Using known conditions for a particular job depends on the nature of the problem at hand. Using known conditions in the set-up and angular readings from the instrument chart, the calculator quickly indicates the identity of elements along with corresponding wave length.

As an example, suppose the X-ray spectrograph is employing a mica (reflecting) analyzing crystal and the chart shows intensity peaks at angular positions of approximately 71° and 72°. Set the mica (reflecting) mark on the calculator opposite 71 on the angular scale. Read Na (Sodium) in the window (K Beta) and about 11.5 Angstroms wave length. Now, set mica (reflecting) mark opposite 72 on the angular scale. Read Na (Sodium) in the window (K Alpha) and approximately 11.9 Angstroms in wave length.

* Research and Control Instruments Division, North American Philips Co., Inc.





ATOMIC NUMBERS AND NAMES OF ELEMENTS USED ON CALCULATOR FOR X-RAY SPECTROGRAPH

11—Na—Sodium
12—Mg—Magnesium
13—Al—Aluminum
14—Si—Silicon
15—P—Phosphorus
16—S—Sulphur
17—Cl—Chlorine
19—K—Potassium
20—Ca—Calcium
21—Sc—Scandium
22—Ti—Titanium
23—V—Vanadium
24—Cr—Chromium
25—Mn—Manganese
26—Fe—Iron
27—Co—Cobalt
28—Ni—Nickel
29—Cu—Copper
30—Zn—Zinc
31—Ga—Gallium
32—Ge—Germanium
33—As—Arsenic
34—Se—Selenium
35—Br—Bromine
36—Kr—Krypton
37—Rb—Rubidium
38—Sr—Strontium
39—Y—Yttrium
40—Zr—Zirconium
41—Cb—Columbium
42—Mo—Molybdenum
44—Ru—Ruthenium
45—Rh—Rhodium
46—Pd—Palladium
47—Ag—Silver
48—Cd—Cadmium
49—In—Indium
50—Sn—Tin
51—Sb—Antimony
52—Te—Tellurium
53—I—Iodine
55—Cs—Caesium
56—Ba—Barium
57—La—Lanthanum
58—Ce—Cerium
59—Pr—Praseodymium
60—Nd—Neodymium
61—Sm—Samarium
63—Eu—Europium
64—Gd—Gadolinium
65—Tb—Terbium
66—Dy—Dysprosium
67—Ho—Holmium
68—Er—Erbium
69—Th—Thulium
70—Yb—Ytterbium
71—Lu—Lutecium
72—Hf—Hafnium
73—Ta—Tantalum
74—W—Tungsten
75—Re—Rhenium
76—Os—Osmium
77—Ir—Iridium
78—Pt—Platinum
79—Au—Gold
80—Hg—Mercury
81—Tl—Thallium
82—Pb—Lead
83—Bi—Bismuth
90—Th—Thorium
91—Pa—Protactinium
92—U—Uranium

Paper and paperboard making—XXVI

Practical Examples of Slice Control—2

HARRY WILLIAMSON

The objective

TO FORM A SHEET of paper with as many of the fibers as possible in a LONGITUDINAL position PARALLEL to the WIRE travel is the objective. For the first time in these discussions we must draw the reader's attention to the fact that the "wire travel" and the "stream flow travel" are two separate factors.

The sheet to be made is crepeing tissue: 15 lb. ream weight, 24x36—500; 50 per cent crepe; trim, 96 in.; machine speed, 1,000 ft. per minute.

Consistency

First in the summary of operating conditions is consistency. The ream weight of 15 lb. per ream of 3,000 sq. ft. of paper is in the lightweight bracket, and therefore the consistency of the mixed volume will be LOW, say from 0.1 to 0.25 per cent fiber and from 99.9 to 99.75 per cent water.

The LOWER the consistency the better the "random orientation" of the individual fibers of the mixed volume in the pond area. In this lower consistency bracket the fibers have less opportunity to form as "floc," or aggregates of fibers. Less turbulence is required in the pond area to keep the fibers evenly distributed, and there is therefore less entrainment of air or creation of "foam bubbles" in the liquid mass.

Machine speed

The speed of 1,000 ft. per minute would necessitate a pond "head height" of at least 60 in. to provide the requisite pressure to produce a "slice velocity" of the mixed volume, which is equal the speed of the running wire.

With a pond of this depth the operating conditions in the POND AREA would be:

(a) A definite confluence of converging flow streams TO and THROUGH the slice opening, which would have the result of

(b) the alignment of the majority of the fibers in longitudinal position parallel to the stream flow.

At this machine speed and ream weight, allowing one inch on each edge for trim, we would make a sheet 98 in. wide at a production rate of 2,430 lb. per hour or 40.5 lb. of paper per minute. Because we have a wide range of consistency values to choose from, we may ignore the factor of 4 per cent moisture retained in the finished sheet as we calculate the gallons per minute of the mixed volume which must be delivered FROM the slice opening TO the wire each minute.

The following table will enable the reader to visualize more readily "the jet like emission" of such large volumes of water and fiber from the slice opening to meet the running speed of the wire.

We must now take into consideration the amount of TIME available in which to drain the formation water through the wire mesh, the means by which the fibers are formed into a continuous sheet. From the table in Chapter Three showing "Comparison Formation Time Relative to Machine Wire Length," we will select three examples of wire length for purposes of comparison. (Table appeared in THE PAPER INDUSTRY for August 1952, page 601.)

Total Wire Length....	80 ft.	84 ft.	115 ft.
Formation Length....	22.8 ft.	23.94 ft.	32.8 ft.
Formation TIME/ seconds	1.368	1.436	1.968

From these three examples we note that a wire 80 ft. in length would give us a "formation length" of 22.8 ft. and, at a running speed of 1,000 ft. per minute, we would have ONLY 1.368 seconds in which to drain the FORMATION WATER through the traveling wire mesh.

Using a wire 84 ft. long, the formation time would increase by 0.068 seconds. This does not seem very much, but, expressed as a percentage of 1.368, it is the appreciable increase of 4.96 per cent. Similarly, if we used a wire 115 ft. in length, the formation time would be increased by 0.6 seconds, and this is the very significant increase of 43.86 per cent MORE TIME than would be available for formation on the 80-foot wire.

For purposes of this summary we will select the wire, in the middle bracket, of 84 ft. in length. At a running speed of 1,000 ft. per minute this will give us a "formation time" of 1.436 seconds.

Having considered TIME, we must now consider VOLUME to be drained through the wire mesh, or a known amount of work accomplished in a given time gives us the TIME RATE of the work to be done, which is "formation." Naturally, if we are to drain water through a wire mesh, then we should know the total amount of OPEN SPACE between the strands of the "warp" and "shute" wires which, woven together, comprise the endless traveling wire on which the paper is formed.

For our 84-foot wire, we will choose a "weave" of 80 plain round "warp" wires woven with 56 "shute" wires; multiply the two figures and we find we have 4,480 open spaces per square inch of weave, or each square inch of weave has 27.2 per cent of OPEN SPACE through which the water can be drained. (Note: The subject of "wire mesh" is dealt with in very specific detail in another section of this chapter.)

The consistency used will of course determine the number of gallons of formation water to be drained per minute to complete the act of formation of the sheet. In this example 40.5 lb. of finished paper, including the moisture content, is the factor used to equate the total volume of liquids and solids in use at any given section of the paper machine operation. The beginning of the machine operation is aptly referred to as the "wet end" because we start out with

Total Mixed Volume per Minute

Paper Per Minute	Mixed Volume Consistency	Mixed Volume Pounds/Min.	Mixed Volume Gallons/Min.
40.5 lb.	0.1%	40,500 lb.	4862 Gal.
40.5 lb.	0.2%	20,250 lb.	2431 Gal.
40.5 lb.	0.25%	16,200 lb.	1944 Gal.

Table Showing Per Cent Solids and Liquid Weights

Location	Per Cent Solids	Per Cent Liquid	Liquid Weight	Total Weight
Liquid Section				
Pond Area	0.1	99.9	40,459.5 lb.	40,500 lb.
End of Formation	10	90	354.5 lb.	405 lb.
End of Suction	16	84	212.6 lb.	253.1 lb.
Solid Section			*Moisture*	
End of Pressing	38	62	66.1 lb.	106.6 lb.
End of Drying	96	4	1.62 lb.	40.5 lb.

Selection of Width of Slice Opening

Gallons Per Min.	Cubic Feet Per Min.	Velocity (Ft./Min.)	Theoretical Slice Opening	Actual Slice Opening
4862	650	1000	0.9176 in.	1 in.
2431	325	1000	0.4588 in.	5/8 in.
1944	260	1000	0.3670 in.	1/2 in.

huge volumes of water and finish up at the "dry end" with a very small amount of moisture.

The very large volumes of water used to form the sheet and also the gallonage extracted from the semi-solid sheet by suction, all used in the "wet end area," are kept in constant and continuous re-use so that the finer particles of fibers, color, and sizing values which may pass through the WIRE MESH and suction boxes will not be lost.

We may now select the consistency and therefore gallons per minute which will be delivered through the SLICE OPENING to form the sheet of crepeing tissue.

The slice opening

The lower the slice lip the less the volume; the higher the slice lip the greater the volume.

The distance of the slice lip from the "making board," which is a continuation of the base of the pond area, is one dimension of the slice opening; this dimension we call the WIDTH of the opening. The second dimension to form the area is the length of the slice fitted across the width of the wet end of the paper machine.

In the transition from the liquid to the solid state, all paper narrows in width or across the grain. This is chiefly caused by shrinkage (see chapters on hydration), and slightly due to elongation by the tension of the draws between the dryer sections. The forming sheet at the wet end of the machine is ALWAYS wider than the finished sheet at the dry end of the machine.

In this example we have noted a finished reel of 98 in. wide untrimmed paper to be trimmed to a commercial roll of 96 in. To make a sheet of this width, we would have to start at the wet end with the mixed volume delivered through a slice opening 102 in. across the width of the paper machine.

Assuming for the moment the slice opening to be 1 in. wide and 102 in. in length, we would then have an open area of 102 sq. in. through which the mixed volume could be delivered to the wire mesh.

To find the width of the slice opening at the consistency and volume we select we may use the following factors taken from the *Paper & Pulp Mill Catalogue*, published by Fritz Publications Inc., Chicago:

"Cubic feet per minute, area of stream being 1 sq. in., head of water 5 ft. in depth will deliver 7.47 cu. ft. per minute at a pressure of 2.17 lb. per sq. in.

"To determine the required area, the volume and velocity of water being given, multiply the number of cubic feet of water by 144 and divide the product by the velocity in feet per minute."

By using these factors, we find the theoretical width of the slice opening and, allowing for friction in proportion to the CONSISTENCY selected, we arrive at the ACTUAL WIDTH to set the slice opening ready for operation. (Note: Slight adjustment of the slices UP or DOWN will be made as to the FREENESS or SLOWNESS of the stock developed by beating. See chapters on stock preparation.)

Now that the preliminary data of "time" in relation to length of wire, the type of "weave" and per cent of "open space" of the wire mesh, the "head height" pressure for a slice velocity of 1,000 ft. per minute, and a bracket of operating "widths" for the slice opening is all assembled, we may proceed to select the "consistency," volume in gallons per minute, and the ACTUAL setting of the slice lip most advantageous to the alignment of the fibers PARALLEL with the WIRE TRAVEL, so necessary in the "formation" of paper for crepeing purposes.

If we were making a normal grade of writing or office-use papers, in which we wish to criss-cross the fibers in formation, we would follow the ratio of gallons/minute velocity to slice opening width, as set forth in the table above, the only deviation being in accordance with the "freeness" or "slowness" of the stock development.

Making a sheet of crepeing however, we wish to accentuate and retain the conditions set up in the pond area, namely, the effect of the confluence of converging flow streams on the alignment of the fibers.

We can accomplish this by using a relatively HIGH slice opening with the SAME "head height," impounding the mixed volume and applying pressure on the delivery release. As the calculation of the depth of the "head height" for pressure and velocity values is taken from the CENTER of the slice opening, then the flow at the BASE of the slice opening is faster than the flow in contact with the slice lip. The higher the slice is carried the more this flow differential is accentuated.

The following are the operating conditions at the "wet end," in the pond area, to start making a sheet for crepeing at 1,000 ft. per minute and to produce 40.5 lb. finished paper per minute.

Total volume, 3,889.5 gpm or 520 cu. ft.; consistency, 0.125 percent; head height, 5 ft. from center of slice opening to surface of impounded liquid; pressure, 2.17 lb. per square inch; delivery volume, 7.47 cu. ft. per square inch of open area per minute; slice opening, 0.75 in. wide by 102 in. long equals 76.5 sq. in. of open space through which to deliver the mixed volume to the wire mesh.

Centrifugal Pumps

Part 23 of a series

Pump Control

IGOR J. KARASSIK and ROY CARTER
Application Engineers, Worthington Corp.*

CONTROLS CAN BE SUBDIVIDED into two distinct classifications: corrective and protective controls. Corrective controls are obviously directed at changing some relationship within the pump system to compensate for changes in the conditions imposed upon the system. This is the case, for instance, when the delivery of a boiler feed pump must be reduced because the boiler demand has decreased, while the boiler level must be maintained constant. Protective controls, on the other hand, are directed at protecting the pump or the system against certain harmful combinations of conditions or, in the event such conditions have arisen, at eliminating them in the shortest possible time.

Pump controls can be logically separated into four individual functional parts:

1. Measuring element.
2. Impulse element.
3. Relay of the impulse.
4. Power element.

Function of measuring element

Fundamentally, all control problems to be encountered in the operation of centrifugal pumps can be reduced to the problem of balancing flows, pressures, temperatures, or combinations of two or more of these. As a result, the measuring element must determine some force or forces set up in the pumping system which change in magnitude as the quantity to be controlled varies. If the quantity in question happens to be fluid flow, this force can be created by a pressure differential across an orifice; if liquid levels are to be controlled, the difference in static head between the level to be controlled and some fixed arbitrary reference level provides this force; if a certain pressure or pressure difference is to be controlled, this pressure in itself provides the force to be measured.

Impulse element

The impulse element is that portion of the control which does most of the thinking, deciding when the measured variable has reached a predetermined value or when it is properly balanced against some other variable with which it must remain in a certain correlation. If the control function is such that variation in the quantities to be balanced is to be constantly accompanied by the desired change in relationship, such as valve setting, pump speed or similar changes, the impulse and measuring elements are integrated. For example, if it is desired to reduce the pump capacity by throttling in some proportion to the reduction in the level in the supply reservoir at the pump suction, the force set up in the measuring element by the magnitude of the level acts directly as the impulse, which will ultimately be transmitted to the throttling valve control.

If on the other hand, control of operation and, therefore, change in relationship is to occur only when the measured quantity reaches some predetermined magnitude, the impulse function becomes divorced from the measuring element and becomes operative only when the forces involved are balanced at the desired value. As an illustration, it may be assumed that the valve in the pump discharge is to be closed off whenever the suction level drops to some set value. The measuring element records at all times the suction level and balances a force proportional to this level against a selected force representing the desired minimum. As long as the measured force exceeds the predetermined force, the impulse is inoperative, but on reaching a balance between the two forces, the impulse mechanism sets in motion certain controls which will close the valve as desired.

Relay element

As will be seen later, the relay of the impulse may or may not exist as a mechanism, depending on whether this portion of the pump control is or is not automatic. In other words, if the impulse element's function is to ring an alarm bell when certain conditions are detected by the measuring element so as to warn the operator, the function of the relay element will be accomplished when the operator walks over to a valve which the alarm has indicated must be throttled. On the other hand, in the majority of control mechanisms the function of the relay element is to transmit the decision reached by the impulse element to the power mechanism, which actually operates the control. This function can be discharged in a wide variety of manners and can be performed mechanically, hydraulically, pneumatically or electrically.

Power element

The power element is that element which performs a change in some relationship in the combination of pump and pumping system, such as a change in the valve setting, a reduction or increase in the pump speed, or the stopping or starting of the pump. Again, the source of the power used in this element may be either mechanical, hydraulic, pneumatic or electrical.

Automatic versus manual controls

While a great number of centrifugal pump controls are automatic in their operation and while most attention is generally directed to such controls, one should not forget that in many instances a choice must be made between manual and automatic controls. This choice is not an easy one to make.

No overall rule or preference can be established in the choice between manual and automatic operation. In the first place, it is highly important to realize that the differentiation between the two types is not as sharp as some engineers may be led to believe. Between the two extremes of fully manual and fully automatic control, there exists a large number of intermediate arrangements, all of them semi-automatic in some one phase of the control mechanism.

Factors in analyzing control method

Without attempting to prepare an exhaustive list of all the factors which must be considered, we may examine some of the most important of these factors and thus indicate the general character of the analysis which must precede a choice between manual and automatic controls. These factors are presented below but not necessarily in the order of their relative importance.

Frequency of Operation. Is the control operation required infrequently or at frequent intervals, possibly constantly? The starting up of a standby pump on failure of the main pump, an operation which is apt to occur very rarely, is less in need of automatic controls than, for instance, the maintenance of a constant pressure in the discharge header, when variations in the flow delivery require constant repositioning of the regulating valve.

Expectancy of Operation. Is the control operation to occur at regularly scheduled intervals or is the require-

Material from this article will be included in a book on centrifugal pumps now being prepared by the authors; hence, all rights to republication are reserved by the authors.

*Formerly Worthington Pump & Machinery Corp.

ment sudden and unexpected? For instance, the starting up of additional boiler feed pumps in a power plant, prior to an expected increase in load at certain times of the day, can be carried out manually quite readily. On the other hand, the start-and-stop operation of a transfer pump which delivers into a storage tank depends wholly on the varying rate of usage from the tank and, therefore, cannot be accurately predictable as to time.

Urgency of Operation. Must the controlled operation take place instantly upon the occurrence of certain conditions or can it take place at leisure? Basically, the differentiation here is one between corrective and protective controls. In the case of the latter, it is almost imperative that the measuring and impulse elements be automatic, lest the measuring element become the visual estimate of the degree of destruction of the equipment and the impulse that to use automatic controls in the future. It is necessary, however, to remember that even certain corrective controls must operate almost instantly, as, for instance, centrifugal boiler feed pump controls intended to maintain a constant level in high pressure boilers.

Difficulty of Operation. Is the application of the control suitable for manual operation or are the forces required to set the control in motion excessive? Taking two extremes for our illustration, it is obvious that while a 1-in. valve can be readily throttled manually, the task of closing or opening a 24-in. valve can be made much simpler if it is provided with automatic electric drive.

Facility of Detection. Is the quantity to be measured subject to accurate determination by human senses or is it impossible to obtain sufficiently accurate measurements except by mechanical means?

Economics of Personnel Attendance. Is an operator always available where needed or does the manual operation of the control require the addition of personnel otherwise not necessary?

Pilot devices

It may be of some interest to note that a great number of automatic controls are electrically operated, so that while the measuring elements may be mechanical or hydraulic, the impulse and relay elements are based on electrical contacts and transmission or interruption of electrical currents. Such automatic controls are principally directed at the interruption or resumption of flow, based on level or pressure fluctuation. Because the currents involved in the operation of the pump drivers are generally excessive for the control apparatus, the latter serve as pilot devices.

Typical types of corrective controls

It was decided to select boiler feed pump controls for detailed analysis. These present such a diversity of problems that almost every basic type of control will be properly represented in this analysis.

We may first approach this study by considering the problems involved. One of the most important requirements in the operation of modern steam generating units is the maintenance of a constant water level in the boiler drum, irrespective of the fluctuation of the load imposed upon the boiler. At the same time, this constant level should be maintained without undue fluctuations in the feedwater flow. The importance of this requirement is further emphasized by the fact that modern boilers have considerably less water storage space than older types of boilers. If the water level is not maintained within safe limits, the operation of the boiler will be affected seriously. Surges in the water level may result either in water getting into the steam header, in overheating and failure of boiler tubes, or in surges in the boiler pressure, thus affecting the operation both of the combustion equipment and of the prime movers.

Serious troubles will likewise result from an undue fluctuation of the feedwater flow by occasioning severe hunting of the boiler feed pumps, possible failure of the suction supply and unequal heating of the feedwater in the stage heaters.

Regulator an artificial source of friction loss

It becomes necessary, therefore, to introduce an artificial source of friction loss, this friction loss being controlled by the changes in the level of the water in the boiler drum. This artificial source of friction loss is provided by the feedwater regulator, which consists basically of two elements: (a) a throttling valve; and (b) a controlling mechanism, which determines the setting of this valve, depending on boiler level fluctuations.

Fig. 1 represents the operation of a centrifugal boiler feed pump at constant speed and illustrates the effect of the feedwater regulator throttling valve at several different positions corresponding to various flow requirements of the boiler. It has been assumed in this case that the boiler pressure is constant at all loads. Thus, depending on the boiler load and consequently on the position of the feedwater regulator throttle valve, the pump discharge capacity will correspond to the intersection of the head-capacity curve with curves (A) to (D) or with any intermediate curve.

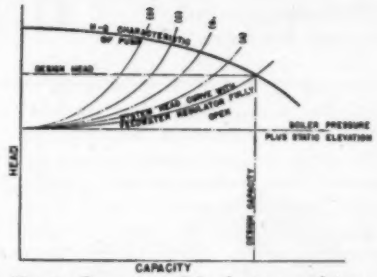


Fig. 1—Operation of feedwater regulator

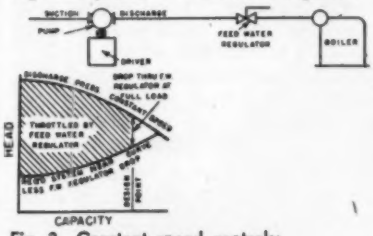


Fig. 2—Constant speed controls; feedwater regulator only

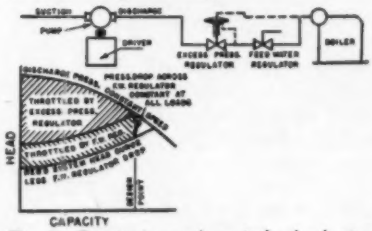


Fig. 3—Constant speed controls; feedwater and excess pressure regulators

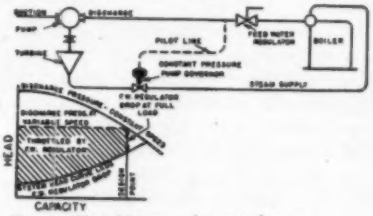


Fig. 4—Variable speed controls; constant discharge pressure

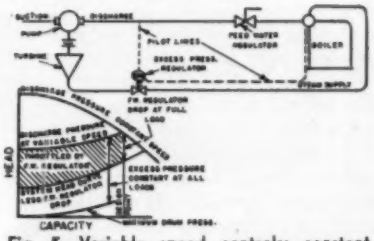


Fig. 5—Variable speed controls; constant excess over boiler pressure

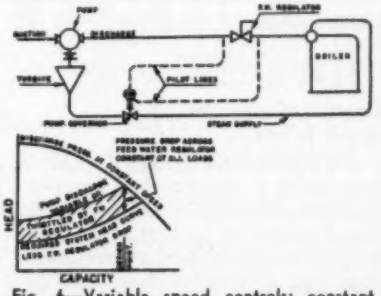


Fig. 6—Variable speed controls; constant pressure drop across feedwater regulator

Differential or excess pressure regulators

The constant boiler level feedwater regulator can be likened to an orifice in a pipeline through which flows the feedwater. The quantity of flow through this orifice obviously depends upon the area of this orifice and the pressure drop across it. As the water level in the boiler rises or falls, the regulator valve moves so that the valve opening is such as to provide the correct rate of feed to the boiler. However, if the pressure drop across this valve is allowed to vary, there will be variations of flow through the valve, even though the area remains constant. While these variations in flow will eventually result in changing the boiler level and consequently the area of valve opening, such variations have an undesirable effect on the boiler load, inasmuch as the flow should vary only as required for load changes.

Inasmuch as the discharge pressure of a centrifugal pump operated at constant speed increases from 10 to 20 per cent between its design condition and extremely low flows, while the required system head decreases as flow decreases, the excess pressure over the system head curve increases very appreciably at light loads. This excess pressure must be absorbed in the feedwater regulator valve and will result in a wide variation in the pressure drop across this valve (see Fig. 2).

To obviate the disadvantages of a varying pressure drop across the feedwater regulator, recourse is taken to differential or excess-pressure regulators. The function of this control is to maintain a more or less constant pressure drop across the feedwater regulator valve by means of one of the following principles:

(a) Throttling the excess pressure generated by the feed pump. This is used when the pump is operated at constant speed.

(b) Decreasing the pressure generated by the pump at various loads by varying the pump speed.

To visualize how an excess-pressure regulator maintains a uniform pressure drop across the feedwater regulator control valve, comparison can be made between Fig. 2 and Fig. 3, which shows both the hook-up of this refinement in pump control and the pressure and capacity relations in a feedwater system fitted with an excess-pressure regulator.

Control of variable-speed pumps

When a centrifugal boiler feed pump is driven by a variable-speed motor or, especially, by a steam turbine, it becomes possible to apply the differential pressure control to even greater advantage. Figs. 4, 5 and 6 show three different arrangements, all embodying a steam-turbine-driven boiler feed pump with a variable-speed governor. In all cases it has been assumed that the boiler drum pressure is not constant but increases with the load so as to maintain a constant steam pressure at the superheater outlet, the increase in drum pressure compensating for increased superheater losses at increasing steam flows.

It will be noted that the three arrangements differ only in the location of the pilot lines leading to the governor. In Fig. 4, representing a constant pressure governor, applied to the steam turbine driving the boiler feed pump, only a pilot line to the discharge from the boiler feed pump is provided and the discharge pressure remains constant at all loads. In Fig. 5, which shows a constant-excess-pressure governor, the pilot lines lead to the pump discharge and to the boiler, respectively, thus varying the pump speed in such a manner that the difference between the pump discharge pressure and the boiler pressure remains constant at all loads. Feedwater regulator pressure drop is not constant but throttles the difference between the pump discharge at variable speed and the pressure representing the system head curve less feedwater regulator drop.

Finally, in Fig. 6, the pilot lines lead to the two sides of the feedwater regulator, so that the pump speed varies in order to maintain a constant pressure drop across this valve. All these pump governors can be arranged to operate separate valves in the steam line ahead of the turbine governor valve, or to operate the turbine governor valve itself.

Two and three-element feedwater regulators

In the preceding descriptions it was assumed that the feedwater regulator was of the simple level, or single-element type design. Actually, at the present time, a great number of installations use a somewhat more refined construction of feedwater regulator, in order to obtain closer control of boiler operation.

The "steam-flow type" or two-element regulator functions primarily on the basis of steam flow rather than on that of boiler level changes. In this arrangement, the regulator is enabled to anticipate level changes and stabilize the level at the desired value. This value itself is determined by the superimposed action of the level-element portion of the control. The steam-flow element is actuated by the pressure drop across an orifice in the steam outlet line or across the superheater section of the boiler.

The three-element regulator superimposes the feedwater flow action over that of the two-element regulator, the third element adjusting the feedwater regulator valve to the opening required to give the rate of feed called for by the first two elements. It must be added that neither the two-element nor the three-element regulators differ in their effect on pump performance from the action of the single element regulator.

Master pump control

In most installations involving several boiler feed pumps, master controls are used instead of supplying each feed pump with its own measuring and impulse mechanism. Master controls present numerous advantages, among which the most important is a greater uniformity of operation between the several pumps.

The primary objective of such master controls is to reduce the power consumption of a group of pumps to a minimum. In large stations where such a group of pumps may be installed, the prime movers driving the pumps may have a capacity of several thousand hp or kw. Hence any power saving in the operation of these pumps may produce a material reduction in the cost of operation. But the individual pumps and prime movers of the group may not all have identical characteristics. The master control system, therefore, is designed to carry out three principal functions:

1. To maintain automatically the desired excess of feedwater pressure over steam pressure at the feedwater regulator valve inlet.

2. To operate the group of pumps automatically at minimum power consumption for various steaming rates of the boilers.

3. To control the pumps automatically to maintain desired division of load among the pumps with stability.

To carry out these functions, the system may be arranged so that a measurement of the flow through each pump, taken on the suction side, is balanced in the pump regulator by a master loading pressure derived from the excess pressure that is to be maintained. Variations in this excess pressure will then cause the pump regulators to adjust the pump speed, and as a result the pump flow, to hold the excess pressure at the required value.

While the control of centrifugal boiler feed pumps cannot be termed as typical of every kind of pump control which may be encountered, certain similarities will be encountered in most cases. Therefore an understanding of what may be accomplished in this particular field of application will prove helpful in solving most pump control problems. The controls described above, however, are basically corrective controls. Protective controls introduce certain problems and features which differentiate them considerably from corrective controls, hence a description of a few typical protective controls will form the subject matter of the next article.

PAPER SKETCHES

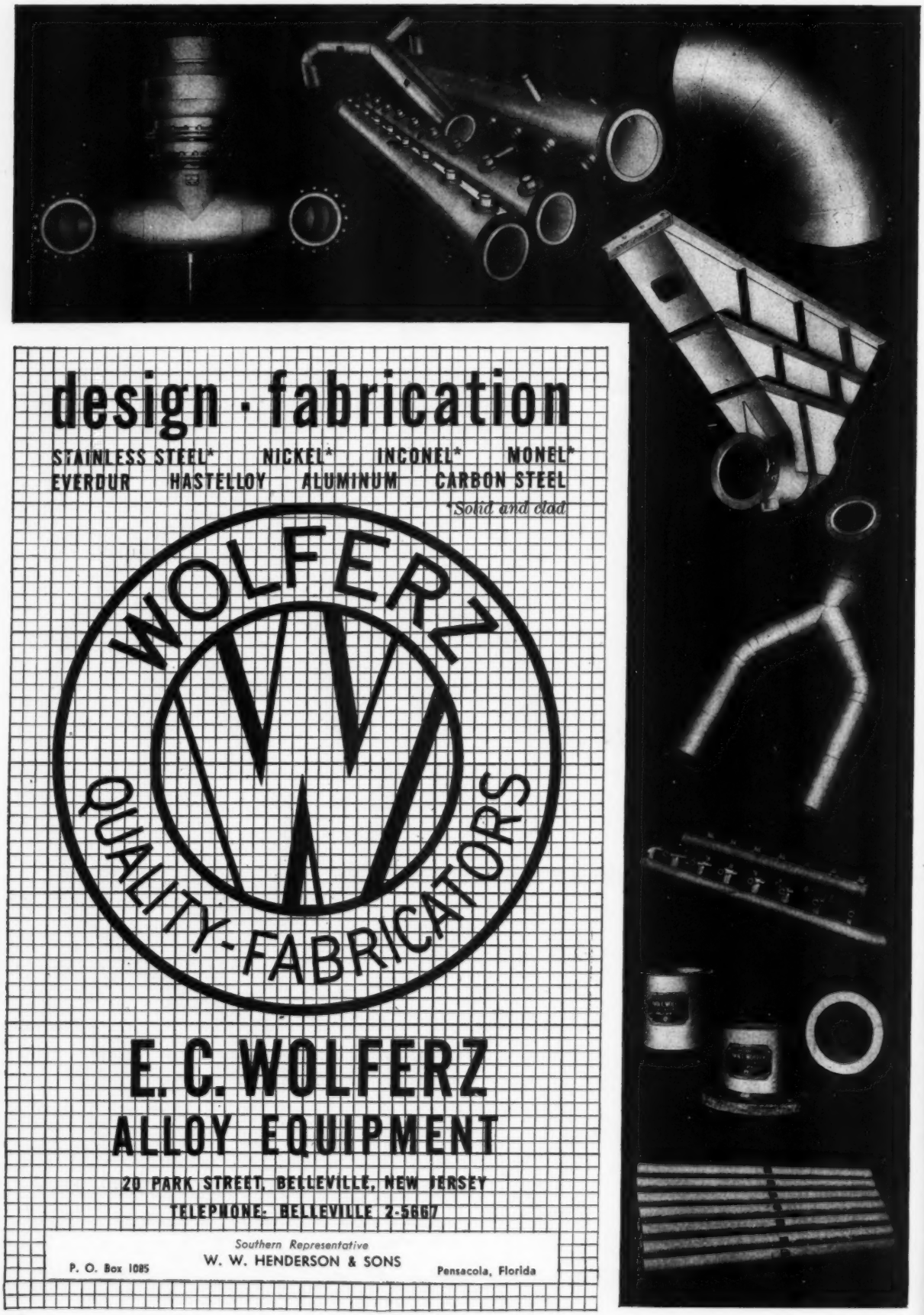
IN THE MID-1800's the shallowest parts of reefs in the Mississippi River often were marked by buoys which, at night, sported paper lanterns holding lighted candles that could be seen a mile or more by river pilots.

THE **FINEST** papyrus of ancient Egypt made from the inner leaf of the plant was reserved for the use of the priests. It was not available to ordinary people.

A **FIBER DRUM** with a polyethlene liner and an aluminum foil barrier has been successfully developed for the shipment of oil.

Odd Bits

From **759 A.D.** on, for almost 500 years, papermaking at Baghdad was maintained as a state monopoly.



design · fabrication

STAINLESS STEEL* NICKEL* INCONEL* MONEL*
EVERDUR HASTELLOY ALUMINUM CARBON STEEL
*Solid and clad

WOLFERZ
QUALITY-FABRICATORS

E. C. WOLFERZ
ALLOY EQUIPMENT

20 PARK STREET, BELLEVILLE, NEW JERSEY
TELEPHONE: BELLEVILLE 2-5867

Southern Representative
P. O. Box 1085 W. W. HENDERSON & SONS Pensacola, Florida

The Paper Industry Association News

Waste Paper Council Forms Governing Body

The Waste Paper Utilization Council, a joint project of APPA and the National Paperboard Association, officially started operations January 5 at 122 East 42nd St., New York, N.Y. One of the first announcements made by the newly formed group was that of the membership of the governing body, as follows:

Paper and Board Mills (consuming members selected by the industry)—Fitchburg Paper Co., Robert Gair Co. Inc., The Mead Corp., National Folding Box Co. Inc., Newton Falls Paper Mill Inc., New York & Pennsylvania Co. Inc., and St. Regis Paper Co. (Kalamazoo).

Waste Paper Dealers (associate members appointed by the president of the Waste Paper Institute)—D. M. Dickson, vice president of Penn Paper & Stock Co., and P. J. White, president of Great Eastern Packing & Paper Stock Corp.

Product Suppliers (advisory members selected by the product suppliers)—E. P. Ryan, chief chemist and manager of the Materials Controls Division of Curtis Publishing Co., and B. J. Taymans, assistant general manager, Printing Industry of America Inc.

The objectives of the new organization are: (1) to promote an increase in the use of waste paper; (2) to gather all information relating to waste paper, its collection and use; (3) to study any technical problems that interfere with the recovery of usable fiber; (4) to conduct such research as may be indicated; (5) to cooperate and consult with organizations on similar problems, and (6) to pass on to its membership the information it gathers and develops.

Chairman of the Council is Earl Weaver, manager of the purchasing department of International Paper Co. Henry J. Perry, former editor of *Paper Trade Journal*, is the director. E. W. Tinker, executive secretary of APPA, is treasurer.

Machine Felt Problems Topic of Miami Valley Supts.

Five experts discussed machine felt problems during a panel session at the January 22 meeting of the Miami Valley Division of the Superintendents Association. The gathering, attended by 175 members and guests, was held at Middletown, Ohio. Discussion chiefly concerned the effect of worm rolls and spreader rolls on felt life, proper speed for whippers on wet felts, tension on felts, the effect of fibers and felt hairs on paper and board on coating and printing, felt cleaners, and synthetic fiber felts.

NEWLY ELECTED OFFICERS of the Paper Mill Men's Club of Southern California are (l to r): Jack L. Perrin of Towlsaver Inc., treasurer; B. E. Calhoon of Marathon Corp., secretary; C. J. Warren of Solo Cup Co., president, and J. C. Fischer of Sherman Paper Products Co., vice president

Panel members included D. W. Newell of Philip Carey Mfg. Co. (chairman); J. E. Hartford of The Black-Clawson Co.; Fred Holmes of Bird Machine Co.; Earl Jones of Champion Paper & Fibre Co., and Bob Purdy of Orr Felt & Blanket Co.

During the program it was pointed out that worm rolls and spreader rolls, if properly used and maintained, would not seriously affect felt life; and, in addition, that these aids would improve felt performance and actually reduce production costs.

Whipper speed

About four beats per minute per foot of felt was suggested as the proper speed for whippers on wet felts. It was also brought out that, on a three or four-slat whipper, the diameter and speed should be so adjusted as to vary with the machine speed to bring about the desired number of beats per minute per foot of felt.

The panel members agreed that "tension on felts" does not mean tension on the jack, but rather the tension at various points in felt travel. Tension at the shortest point is not as important as the tension at the longest point of the felt. Although everyone present recognized the seriousness of the problem involved, no solution was offered as to ways and means for eliminating felt hairs on the sheet surface.

In the discussion on felt cleaners it was noted that the recommendation of Bird Machine Co. calls for 4 to 6 inches of vacuum on its jordan-type shoe and not more than 10 inches on any type. Mount Hope Machinery Co.'s expanding roll was discussed. In this respect, it was revealed that board machines, now running without a whipper on the top felt, are equipped with three expanding rolls and high-pressure showers for felt cleaning.

Blends of 20 to 40 per cent synthetic fiber felts, according to comments made during the discussion, have been used quite widely. It also was stated that Nylon or Orlon have been used in the filling yarns to reduce abrasive wear; also, that trial felts made of 100 per cent synthetic fibers have been used with promising results.

Renewal of Strong Demand Predicted at Mich. Meeting

A renewal of the basic strong demand for paper products was forecast January 15 by A. Newell Rumpf, vice president of Harris Trust & Savings Bank, Chicago, as he addressed a joint dinner meeting of the Kalamazoo Valley Section of Tappi and the Michigan Division of the Superintendents Association. His topic was, "Some Economic Aspects of the Pulp and Paper Industry."

Mr. Rumpf declared that the paper industry is by no means static, and that the earnings record of the industry will stand up with "all-industry" earnings in depression as in prosperity. After touching on business conditions in the industry both during the early depression years and during World War II, the speaker said that from 1940 until last year "we were in a dream market, where the only limitations were those of raw materials, price ceilings and taxes."

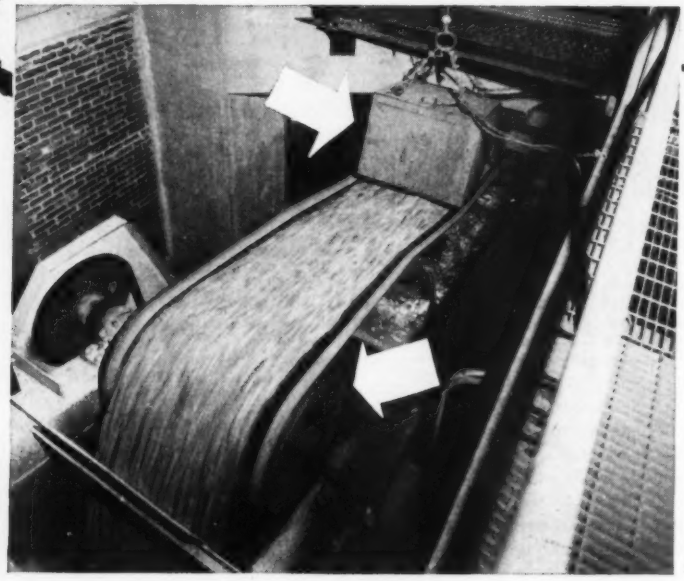
A. T. Luey of Sutherland Paper Co., Kalamazoo, chairman of Kalamazoo Tappi, presided, while Maxwell Bardeen of Lee Paper Co., Vicksburg, served as toastmaster.

Among the special guests at the meeting were Gordon K. Singletary of Brunswick Pulp & Paper Co., Brunswick, Ga.; William H. Brydges of Lynchburg, Va., and Harry E. Weston of Chicago. Mr. Singletary is national president of the Superintendents Association; Mr. Brydges a trustee and past president, while Mr. Weston is secretary-treasurer.

Following the meeting, Mr. Singletary expressed his pleasure at being present at the gathering. He commented on the high quality of the meeting and similarly referred to several 1952 fall meetings of various divisions. Mr. Singletary declared that he had been present at the fall gatherings of the Pennsylvania - New Jersey - Delaware

Dings Double-Barreled Protection Virtually Eliminates Tramp Iron Damage

Florida Mill Uses Rectangular Magnet Over Belt Plus Electromagnetic Head Pulley



THE BIG DINGS Rectangular Suspended Magnet shown digs down as deep as 18" to yank tramp iron out of wood chips passing rapidly beneath it. If anything gets by this one, it's likely to be close to the belt. The electromagnetic head pulley is at maximum effectiveness here and therefore completes the iron removal job.

Here's what the plant engineer of this Florida mill says . . . *"Since this installation we have not lost 5¢ in machinery damage or 5 minutes in downtime due to tramp iron. From our experience, we cannot too highly recommend the installation of magnets performing the same work these are performing . . . We are 100% satisfied and feel it is one of the best expenditures we have made."*

NEW! DINGS RM RECTANGULAR—the most powerful tramp iron magnet available—extracts iron through distances up to 36". Write for details.

"100% satisfied" . . . a statement made from the field that offers PROOF of performance.

For details on either or both of these magnets just ask for the Rectangular or Pulley Catalogs.

DINGS MAGNETIC SEPARATOR CO.
4762 W. Electric Avenue,
Milwaukee 46, Wisconsin

Dings MAGNETS

group, the New York-Canadian group and the Southern and Southeastern groups' joint get-together. In every instance, he concluded, he was convinced of the growing importance of these and other such meetings in the development of the industry.

Pacific Coast Tappi and Supts. Plan Joint Meeting

The 1953 spring meeting of the Pacific Coast Division of the Superintendents Association will be a joint gathering with the Pacific Section of Tappi, which is to be staged at the Gearhart Hotel, Gearhart, Ore., May 22 and 23.

Co-chairmen for the meeting are William W. Clarke of Longview Fibre Co. for the Superintendents, and F. J. Weleber of Publishers Paper Co. for Tappi.

Morning and afternoon technical sessions are to be held on the first day, as will a joint luncheon for both men and women. There is to be a dinner-dance in the evening. On the second day the International Brotherhood of Migratory Peddlers will stage its Wake 'Em Up Breakfast, to be followed by technical sessions in the morning, golf in the afternoon, and a dinner-dance in the evening.

Superintendents Announce 6th Bolton Award Contest

The Sixth Bolton Award Contest, conducted by the Superintendents Association, has as its subject "The Obligations of a Company to its Employees." The competition is open to all employees of North American paper mills. Its closing date will be March 31. Thirteen cash prizes amounting to $3,250 are offered.

The entries will be judged by two juries appointed by the Association. The papers will be given code numbers before they are submitted for judging. Names of the contestants will be filed confidentially by the Superintendents Association.

John W. Bolton & Sons Inc. of Lawrence, Mass., makes the awards. The firm will also publish the prize-winning articles in book form and will make the books available to persons in the paper industry without cost. A copy of the rules of the contest may be obtained by addressing Harry E. Weston, secretary and treasurer, The American Pulp and Paper Mill Superintendents Association, 111 West Washington St., Chicago 2, Ill.

Association Notes

Northwestern Superintendents will hold their 1953 spring meeting May 8-9 at the Dell View Hotel, Lake Delton, Wis. According to J. A. McPherson of Mosinee Paper Mills Co.,

secretary-treasurer of the division, the fall meeting is to be held September 11-12; the place of the gathering has not been determined.

Pacific Section Tappi

will stage its annual Shibley Award Contest meeting March 13 at Longview, Wash.

Lake Erie Tappi

will discuss "Cost Saving Equipment for Today and Tomorrow" at its February 20 meeting at the Hotel Carter, Cleveland. On March 20 the subject will be "Surface Characteristics for Printing."

Coming Events

TAPPI Meetings

Feb. 20—Lake Erie Section, Hotel Carter, Cleveland.

May 22-23—Pacific Section, joint meeting with Pacific Coast Division of the Superintendents Association, Gearhart Hotel, Gearhart, Ore.

American Pulp & Paper Mill Superintendents Association meetings

Feb. 26—Miami Valley Division, American Legion Hall, Middletown, Ohio.

March 19—Michigan Division, Hotel Harris, Kalamazoo.

March 26—Miami Valley Division, American Legion Hall, Middletown, Ohio.

April 16—Michigan Division, Hotel Harris, Kalamazoo.

April 23—Miami Valley Division, American Legion Hall, Middletown, Ohio.

May 8-9—Northwestern Division, Dell View Hotel, Lake Delton, Wis.

May 15-16—Pennsylvania-New Jersey-Delaware Division, Hotel Stacy-Trent, Trenton, N.J.

May 21—Michigan Division, Hotel Harris, Kalamazoo.

May 22-23—Pacific Coast Division, joint meeting with the Pacific Coast Section of Tappi, Gearhart Hotel, Gearhart, Ore.

June 9-11—National meeting, Atlanta-Biltmore Hotel, Atlanta, Ga.

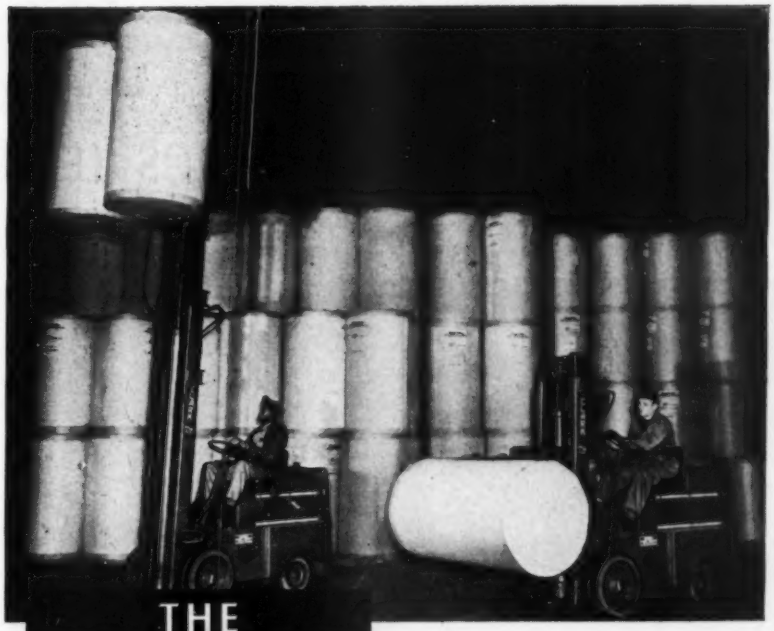
Other meetings

March 19-20—National Collegiate-Industry-Government Conference on Instrumentation, Michigan State College, East Lansing, Mich.

April 21—Association of Consulting Chemists and Chemical Engineers Inc., symposium and dinner, Hotel Belmont-Plaza, New York, N.Y.

April 26-29—American Institute of Chemical Engineers, joint meeting with the Chemical Institute of Canada, Royal York Hotel, Toronto.

June 4-6—CPPA, technical section, Saranac Inn, Saranac Lake, N.Y.



THE WORLD OVER

MULTIPLY YOUR STORAGE SPACE BY USING CLARK EQUIPMENT

This is the modern method by which alert business men throughout the world are satisfying the need for increased storage space without investing a penny in building costs: the Clark method of materials handling.

Clark fork-lift trucks enable you to utilize your "air rights"—by putting idle space near the ceilings to profitable use. They promote orderly efficient warehouse planning—every commodity in its assigned place. Materials move into and out of storage a great deal faster—making it easy to handle a far larger volume of goods. Accidents and damage losses are sharply reduced. Using unit loads composed of multiple items save much time in taking inventory. Actually, storage capacity is usually doubled, in many instances tripled, by carefully planned use of these powerful, fast, safe, efficient machines.

For full information on this more efficient modern method, consult the Clark dealer in your area. You'll find him a competent counselor on all problems of handling materials at lowest cost. Call him today—he's listed under "Trucks—Industrial" in the yellow pages of your phone book.

1903 1953 CLARK EQUIPMENT

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS • INDUSTRIAL TOWING TRACTORS

Industrial Truck Division • CLARK EQUIPMENT CO. • BATTLE CREEK 22, MICH.

Please send: ☐ Movie Digest ☐ Safety Saves ☐ Basic Facts ☐ Material Handling News

Name .....

Firm Name .....

Street .....

City ..... Zone ..... State .....

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

The Paper Industry Names in the News

A GROCERY BAG sheathed in bronze and mounted on a black marble base was presented to Alexander Calder, president and chairman of the board of Union Bag & Paper Corp., recently as he celebrated his 40th anniversary with the firm; presented by his associates, the trophy represented the 258,000,000,000th paper bag produced by Union during Mr. Calder's 40-year career; Mr. Calder became president of the company in 1931

Oxford Paper Names New Vice Presidents

Oxford Paper Co., Rumford, Maine, has named three new vice presidents. *T. E. BRUNING,* treasurer, becomes vice president, treasurer. *T. F. SPEAR,* mill manager and assistant vice president, becomes vice president for public relations. And *H. J. BUNCKE,* manager of engineering and assistant mill manager, becomes vice president for engineering.

HAROLD M. ANNIS, manager of product development, has been named technical director for the firm. *WALTER W. HOLLAND,* who has been manager of production, becomes mill manager.

Cancell Named Rhinelander Director

B. R. CANCELL, vice president in charge of operations of Rhinelander Paper Co., Rhinelander, Wis., is one of four new directors named at the firm's annual board meeting recently. At the meeting, board membership was increased from seven to 11.

Other new directors include *J. L. BUCHANAN,* vice president of the First National Bank of Chicago; *M. H. HERRIOTT* of Lines, Spooner & Quarles, Milwaukee law firm, and *H. W. MURRAY,* vice president of A. G. Becker, Chicago investment banking firm.

St. Regis Appoints Pensacola Gen. Supt.

WINSLOW B. MILLS has been appointed general superintendent of St. Regis Paper Co.'s pulp and paper mills at Pensacola, Fla. He is being suceeded in the position of general superintendent of the firm's mills at Carthage, Herrings and Watertown, N.Y., by *LAURENCE T. WATERMAN.*

Mr. Mills has been associated with St. Regis for the past 14 years. He was formerly with Advance Bag & Paper Co., International Paper Co., Oxford Paper Co., and Gillman Paper Co.

In other St. Regis changes, *WALTER BUCHANAN* has been appointed paper mill superintendent at Harrisville, N.Y., succeeding William Argy, who has resigned. Mr. Buchanan's most recent position was as paper mill superintendent at St. Lawrence Paper Co., Norfolk, N.Y.

At the Deferiet, N.Y., plant, *JOHN J. CARROLL* has been promoted to sulfiite superintendent, succeeding Charles Dawson, resigned. *JOSEPH POWELL* succeeds Mr. Carroll as assistant sulfite superintendent. *DONALD M. FERGUSON* has been named superintendent of the beater room, succeeding Richard Bodette, resigned. *ELMER BAILEY* has been named general yard superintendent, succeeding the late William Talbot.

AFA Names Besley Executive Director-Forester

LOWELL BESLEY, professor of forestry and dean of the Forestry School at the University of British Columbia, has been named executive director-forester of the American Forestry Association effective July 1. The appointment marks the completion of a current reorganization program in the 77-year-old association.

Mr. Besley, 43, is the son of Fred Besley, a former state forester in Maryland. He is a graduate of Cornell University and received his M.F. from the Yale University School of Forestry. Following teaching assignments at Pennsylvania State College and West Virginia University, he went to the University of British Columbia in 1948 to head up and organize that school's forestry department. In addition, Mr. Besley has done work for the West Virginia Agricultural Experiment Station, Maryland State Department of Forestry, the U.S. Forest Service, Duke University, the Appalachian Forest Experiment Station, and the West Virginia State Planning Board.

In the private field, he has served as a forestry consultant for AFA; consultant for C. D. Schultz & Associates, British Columbia forestry consultants; field assistant for Franklin W. Reed, consulting forester in Maryland, and as chief-of-parties for the management inventory of Canadian Western Lumber Co.

R. A. McDonald Retires as C-Z Vice President

R. A. McDONALD has retired after 24 years with Crown Zellerbach Corp. He relinquishes titles of director, executive vice president and chairman of the executive committee but announces

that he will continue to serve as a director. He recently was made chairman of the executive committee of the newly formed East Texas Pulp & Paper Co., a joint venture of Time Inc. and Houston Oil Co.

Mr. McDonald joined Crown Zellerbach in 1928 after a successful career with Western Wax Paper Co. He later helped bring about a merger of the two companies. He recently served as administrator with the National Production Authority.

Other C-Z appointments

DR. WALTER F. HOLZER of Camas, Wash., assistant director of research for Crown Zellerbach, has been promoted to the newly created position of assistant to the vice president in charge of manufacturing. He will maintain his headquarters in Camas.

Associated with C-Z since 1929, he received his Ph.D. from the Institute of Paper Chemistry in Appleton, Wis., in 1934. He then joined Rhinelander Paper Co. as chief chemist and later went to Fox River Paper Co. as technical superintendent. He returned to C-Z in 1938, becoming assistant director of research in 1949.

In other administrative changes, *WILLIAM HART* of San Francisco becomes secretary of the newly formed executive development committee; *E. A. PAUL* of the Camas Division, general personnel superintendent at San Francisco, and *HAROLD F. CARPENTER* of the Port Angeles Division, industrial and community relations director at Camas.

Several promotions of supervisory personnel at Camas have been announced by F. A. Drumb, resident manager. *W. C. JACOBY* has been made assistant sulfite superintendent; *O. C. WHEELER*, assistant superintendent; *W. H. SHOCKLEY*, sulfite mill shift foreman; *R. G. STEWART*, assistant technical supervisor, and *FRED STOLTZ*, bag factory superintendent.

Wm. Caddoo

Wilfred Scheide

Robert Gair Appointments

Norman F. Greenway, vice president in charge of the folding carton division of Robert Gair Co. Inc., New York, N.Y., has announced the appointment of *WILLIAM H. CADDOO* and *WILFRED W. SCHEIDE* as his assistants. Mr. Caddoo will be in charge of paperboard production, while Mr. Scheide will be in charge of folding carton production.

Mr. Caddoo had been division manager for the past three years at the firm's Thames River division, New London, Conn. Previously he had been technical director of paperboard mill operations. Mr. Scheide was at one time carton production manager for American Coating Mills, Chicago.

In another Gair appointment, *ROGER C. DICKEY* has been named assistant to the process engineer in the folding cartons division. He is to be in charge of mechanical packaging. Mr. Dickey was at one time sales engineer for International Paper Box Machine Co., Nashua, N.H.

Hoffman Named Hammermill Pulp Mill Superintendent

Hammermill Paper Co., Erie, Pa., has announced the appointment of *SCOTT HOFFMAN* as superintendent of the pulp mill. He succeeds *LUTHER BEIGHEY*, superintendent of the pulp mill since 1934, who will now be employed as a Hammermill consultant.

Mr. Hoffman joined the firm in 1933. Like the man he succeeds as superintendent, he held virtually every position in the department, was technical assistant in the pulp mill prior to his promotion.

In other Hammermill appointments, *HAROLD G. LOYER* has been made general foreman and *CHARLES R. TAIT* technical coordinator in the pulp mill division. Both are veterans in the Hammermill organization.

Executive Appointments Made by Stone Container

JOSEPH J. FIORI has been named vice president in charge of Stone Container Corp.'s paper mills, it was announced recently by Norman H. Stone, president. Since joining the firm in 1946, he has served as general manager of paper mill operations. Prior to joining Stone, Mr. Fiori had held supervisory positions with Container Corp., Ohio

---

Niederauer Named Mead Production Manager

EDWARD H. NIEDERAUER, assistant manager of Escanaba Paper Co., has been promoted to production manager of the Kingsport, Tenn., division of The Mead Corp. He was to begin his new duties about the middle of January, succeeding William H. Teter, who has been named to the newly created position of director of planning.

A 1929 graduate of Purdue University, Mr. Niederauer joined Mead in the Chillicothe, Ohio, laboratory. In 1931 he was placed in charge of technical service at the Sylva, N.C., mill, returning to Kingsport the following year as assistant technical director. After serving at the Dill & Collins Division in Philadelphia, he was, in 1947, sent to Escanaba as general superintendent. Two years later he was assistant manager, and in 1951 was elected vice president.

Other Mead appointments include that of *A. RODNEY BOREN* as assistant vice president for paperboard. Mr. Boren, who has been working in the firm's paperboard sales since 1949, has been assistant to Vice President Alan Goldsmith.

JOHN R. TAGGERT has been promoted to assistant production manager at Kingsport. At Escanaba, *O. C. CHRISTIANSEN* has been promoted from assistant to the plant engineer to paper mill superintendent, and *CLARK GREENLES* has moved up from day foreman to assistant superintendent.

E. H. Niederauer

W. H. Teter

A. R. Boren

J. R. Taggert

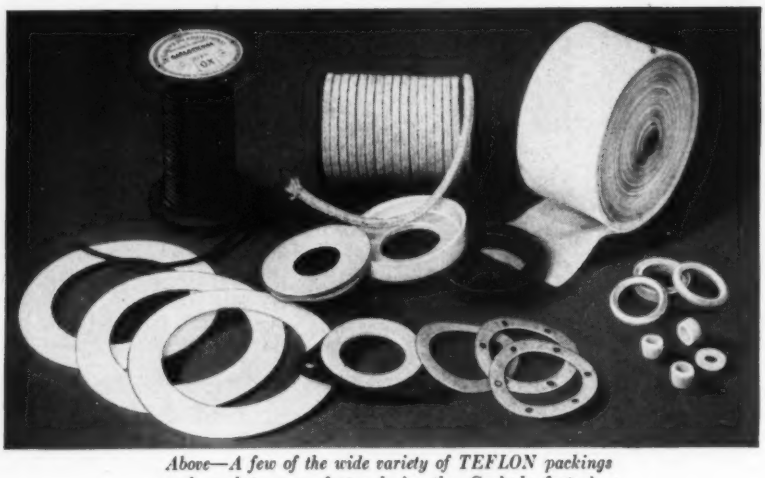
O. C. Christiansen

Clark Greenles

When it comes to

Teflon* PACKINGS and GASKETS

come to Garlock...manufacturers of mechanical packings since 1887



Above—A few of the wide variety of TEFLON packings and gaskets manufactured in the Garlock factories.

GARLOCK pioneered in the design and manufacture of packings and gaskets made of TEFLON. Garlock products made of TEFLON are unaffected by acids, organic solvents and other chemicals at operating temperatures from below −90°F. up to 500°F. These packings and gaskets are ideally suited for many other applications due to TEFLON's low coefficient of friction.

We have the facilities to mold, machine, or form TEFLON in a wide variety of shapes and sizes for packing and gasketing. When you need finished TEFLON parts contact your Garlock representative or write for our TEFLON Catalog.

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK
In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

*The DuPont Company's Trademark

GARLOCK

PACKINGS, GASKETS, OIL SEALS,
MECHANICAL SEALS,
RUBBER EXPANSION JOINTS

Boxboard Co., and Gibraltar Corrugated Co.

GEORGE CHAZANOW has been made a vice president for finance but will retain his position as assistant to the firm's executive officers. *IRVING G. HEFTER*, headquartered in Chicago, has been promoted from a regional sales manager to a vice president in charge of national accounts.

J. J. Fiori

T. B. McCabe

THOMAS B. McCABE, president of Scott Paper Co. and former chairman of the Board of Governors of the Federal Reserve System, is the recipient of the third annual Pennsylvania Award for outstanding service to the American competitive system.

J. A. QUINLAN, vice president of St. Regis Paper Co., New York City, has been appointed chairman of the traffic committee of the American Paper and Pulp Association to succeed *W. L. THORNTON, JR.*, general traffic manager of Kimberly-Clark Corp., Neenah, Wis., who has served as chairman for the past three years.

H. L. RAMMER has been appointed technical director for all sixteen plants of Fibreboard Products Inc.

H. L. Rammer

J. D. Zink

JOHN D. ZINK has been appointed assistant general manager of Hammermill Paper Co., Erie, Pa. In addition to his new responsibilities, he continues as vice president and director of merchandising. Prior to his association with Hammermill, he had been president and general manager of Old Colony Envelope Co. and president of Strathmore Paper Co. Mr. Zink is a member of the statistical committee of APPA, treasurer for the National Council for Stream Im-

provement, and a member of the Pulp, Paper and Paperboard Industry Advisory Committee of the NPA.

JAMES A. COBB has been promoted to assistant general manager of the Rock Hill, S.C., converting plant of National Container Corp. He had previously been associated with the sales department of the company.

J. A. Cobb

Ernst Mahler

ERNST MAHLER, member of the executive committee and director of Kimberly-Clark Corp., Neenah, Wis., has been elected to the board of the Wisconsin Bankshares Corp., succeeding the late F. J. Sensenbrenner. Since 1947, Mr. Mahler has been a director of the First Wisconsin National Bank and the First Wisconsin Trust Co., both members of the Bankshares group.

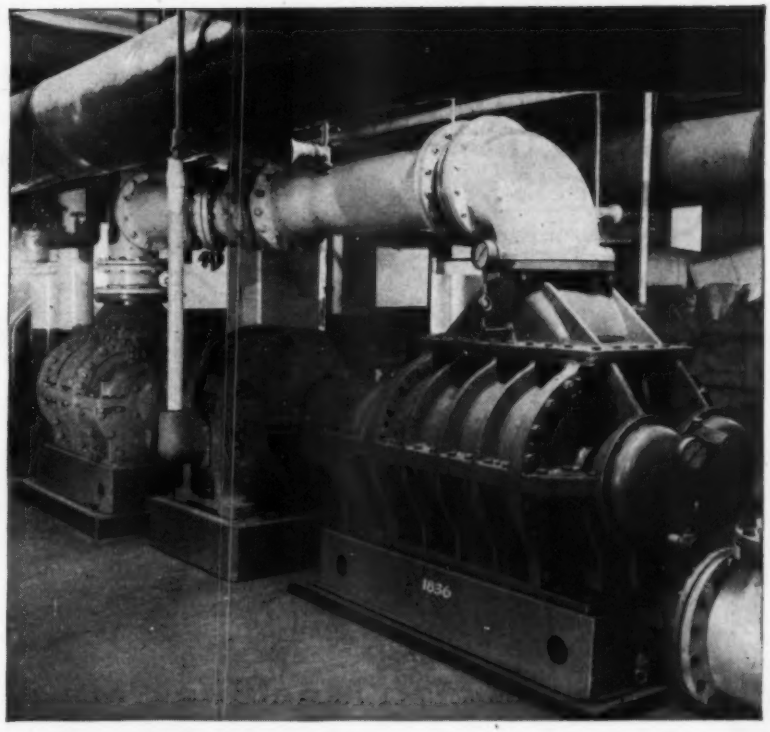
DONALD H. BREWER, recently appointed general manager of the folding carton and boxboard division in Container Corp. of America's Central Division, has been elected a vice president of the company. He joined the company at its Ogden, Chicago, shipping container plant in 1934 and four years later became plant superintendent and later assistant plant manager.

D. H. Brewer

J. C. Worsham

JAMES C. WORSHAM, tour foreman of Crystal Tissue Co., Middletown, Ohio, retired January 1, after 29 years of service with the company. He joined the company in 1923 after serving his apprenticeship with several other paper mills in the Miami Valley.

RAYMOND E. BAKER, manager of Weyerhaeuser Timber Co.'s Longview pulp division, began a three-month tour of duty in the firm's executive offices in



AIR-HANDLING "Specialists" HELP SOLVE VACUUM PUMP PROBLEMS

We do not consider as anything remarkable the records for economy and reliability established by Roots-Connersville Vacuum Pumps. We simply applied to the specific problems of the paper industry the proved principles of design and construction accumulated in our almost a century of experience in building air- and gas-handling equipment, *exclusively*. The results have proved profitable to paper mill operators because of these advantages:

Lower first cost
Very little sealing water needed
Smaller floor space needed
Reduced power consumption
Low maintenance expense
Less expensive foundations
Performance not adversely affected by high temperature of incoming air or sealing water

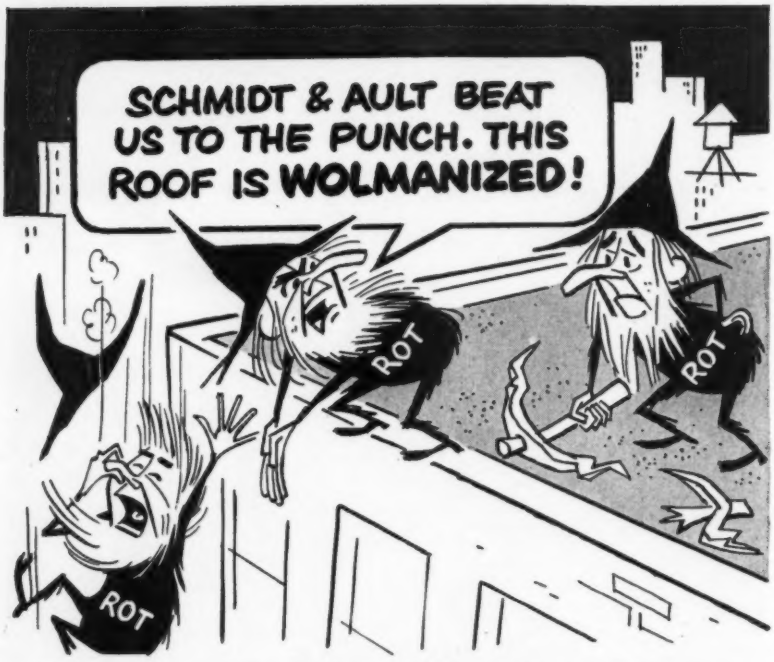
The combination of operating savings with proved month-after-month reliability accounts for the growing acceptance of these simple, rotary positive single or compound units, operating at speeds of 600 rpm or higher.

This long, specialized experience is at your command for solving vacuum pump problems, or for any other equipment needed to handle air—or gas.

Write for Paper Mill Bulletin 50-B-13.

ROOTS-CONNERSVILLE
Exclusive Specialists in Handling Gas and Air

ROOTS-CONNERSVILLE BLOWER A DIVISION OF DRESSER INDUSTRIES, INC. 153 Monroe Ave. • Connersville, Indiana



Another wooden Machine Room Roof continues to give satisfaction

• Schmidt & Ault Paper Company of York, Pennsylvania, knew what a serious maintenance problem they had in the roof over their machine room. Extremely high humidity and temperature in the rooms below made the roof a natural prey to rot and decay.

Starting in 1930, they began replacing the old gypsum roof, section by section, with pressure-treated "Wolmanized"* lumber. After years of satisfactory service, this roof is, according to Mr. Henry D. Schmidt, President of Schmidt & Ault, ". . . DOING A VERY GOOD JOB. SO MUCH SO THAT WE PLAN TO CONTINUE TO USE 'WOLMANIZED' LUMBER ON ANY OTHER ROOFS OVER ROOMS IN WHICH THE ATMOSPHERE IS INVARIABLY HUMID."

The construction of roof decks, floors and structural members in paper mills calls for the insulating qualities of wood. "Wolmanized" pressure-treatment makes this wood last longer.

Many of your maintenance problems are brought about by the continual presence of heat and humidity. "Wolmanized" lumber can solve these problems. Ask your plant engineer or architect about "Wolmanized" pressure-treated lumber . . . or write for complete information and the folder, "Wood Preservation."

American Lumber & Treating Company

General Offices: 1601 McCormick Bldg. • Chicago 4, Illinois

Offices: Little Rock, Ark. • Portland, Ore. • Boston • Los Angeles
San Francisco • Baltimore • New York • Jacksonville, Fla.

Wolmanized
PRESSURE TREATED
Lumber
* Reg. U. S. Pat. Off.

Tacoma, Wash., January 5. He is the fourth Weyerhaeuser branch manager to participate in a program to familiarize branch management with general office procedures. *E. N. WENBERG*, superintendent of paperboard production, will be in charge during Mr. Baker's absence.

REED H. JENSEN, an assistant forester in the north central region of the U.S. Forest Service at Milwaukee since 1947, has been transferred to Portland, Ore. He has been regional fiscal agent and will be succeeded by *F. HAROLD HUFF*, fiscal agent for the Alaska region, at Juneau.

J. FREDERICK HUNT recently announced his retirement as secretary-treasurer of Kimberly-Clark Corp. and its subsidiaries, a position he has held since 1945. He joined the corporation in 1930 as comptroller and was named secretary in 1937.

D. C. EVEREST, chairman of the board of directors of Marathon Corp., has been re-elected a member of the board of directors of the National Industrial Conference Board for a one-year term. He has been active in the work of the board since 1950 when he was first named as a member.

ROBERT H. ORCHARD has been elected president of Orchard Paper Co., St. Louis, Mo., to succeed his father, the late Herman C. Orchard, founder of the firm, who died in June. He previously was vice president of the firm.

Two new members who have been named to the advisory committee of the paper technology curriculum at Western Michigan College are: *BERT H. COOPER*, vice president of Kalamazoo Paper Co., and *E. E. LUDWIG*, vice president of Bermingham-Presser Co. They replace *MAXWELL BARDEEN*, president of Lee Paper Co., Vicksburg, Mich., and *FREDERICK B. CURTENIUS*, treasurer of Kalamazoo Paper Co.

HAROLD E. TALBOTT, designated as Secretary of the Air Force, has resigned as director and chairman of the Finance Committee of Mead Corp., Dayton, Ohio. *AL H. MAHRT* has been made chairman of the Finance Committee, succeeding Mr. Talbott.

LEON J. KOERNER has retired as president of Alaska Pine & Cellulose Co. Ltd. and has been succeeded by his brother, Walter. Recently appointed general manager of Alaska Pine & Cellulose was *PAUL E. ROBERTS*, who was formerly with Abitibi Power & Paper Co. Ltd.

R-S valvEvents

• EXCERPTS FROM THE R-S BOOK OF EXPERIENCE •

For Operating Ease in Inaccessible Locations

INSTALL R-S CHAINWHEEL VALVES

Few Chainwheel Turns. R-S Valves are completely closed from the fully open position by the movement of the valve vane through 77½° of arc. Operating ease is one of the chief advantages of R-S Valves.

Economy in First Cost. R-S narrow face-to-face design results in minimum number of working parts, less metal, less machining, lower weight and less supporting structure—hence economy in first cost.

Accurate Engineering. Body assemblies are accurately engineered mechanically and metallurgically. A. S. A. standards are equaled or exceeded in every detail.

Low Pressure Drop Saves Power. In the open position the streamlined vane causes a Venturi action. Pressure drop is therefore exceptionally low. Pumping costs are reduced accordingly.

More Control Rangeability. Power-controlled prime movers delivering 15 foot-pounds to 38,000 foot-pounds of torque open or close at any desired speed. Full closure requires one second to ten minutes depending on requirements and the type of material controlled. Positive shut-off is obtained with a rubber seat.

Self-cleaning. There are no pockets to house sediment, no change of flow direction to create turbulence or wire drawing and therefore less likelihood of erosion and cavitation.

Maintenance Practically Nil. Every R-S Valve is designed and constructed for rugged service and provided with safety factors to give complete satisfaction in the service for which it is designed. Packing trouble is not common to R-S Valves since the shaft moves only with an oscillating motion.

Consult your local R-S Valve Engineers, or write direct.

R-S PRODUCTS CORPORATION • 4600 Germantown Ave., Philadelphia 44, Pa.

An S. Morgan Smith Company Subsidiary

DISTRICT OFFICES IN PRINCIPAL CITIES

The Paper Industry Necrology

Dr. C. J. West

Dr. Clarence J. West, editor of the Institute of Paper Chemistry and internationally known bibliographer, died January 29 at Appleton, Wis.

Dr. West, who was born at Brighton, Mich., in 1886, received his A.B. and Ph.D. degrees at the University of Michigan. Earlier he had received a teaching degree from Michigan State Normal College at Ypsilanti, where he was given an honorary Master of Education degree in 1938.

After earning his doctorate in 1912 in physiological organic chemistry, he joined the staff of the Rockefeller Institute for Medical Research. During World War I he served as a major in the Chemical Warfare Branch; subsequently he was promoted to the rank of lieutenant colonel in the Army Reserves. For two years following the war he was with Arthur D. Little Inc. In 1921 he became associated with the National Research Council in Washington, D.C. He remained there until 1936, at which time he came to the Institute of Paper Chemistry.

He collaborated after the war with Gen. Amos A. Fries, commanding general of the Chemical Warfare Branch, in writing the first book on the subject of chemical warfare. Later Dr. West also collaborated with Dr. G. J. Esselen in the translation of Dr. Emil Heuser's "Cellulose Chemistry," one of the first standard German texts made available in English. While with the National Research Council he was editor of the International Critical Tables and the Annual Survey of American Chemistry. For many years he was co-editor of the Organic Section of Chemical Abstracts and since 1922 in charge of the section on cellulose and paper.

His outstanding contribution to the technical progress of the pulp and paper industry received recognition in 1937, when he was awarded the Tappi Gold Medal. From 1920 until his death, Dr. West had been chairman of the Tappi Committee on Abstracts and Bibliography and had served as chairman of the editorial board of the organization's monthly publication. His bibliographies in bound volumes cover the period from 1900 to date. He had published more than 700 books, articles, translations, and book reviews. Recently it was estimated that he had prepared more than 30,000 abstracts during his abstracting career—more than any other abstractor has compiled. Because of his efforts the scientific literature of the pulp and paper industry is probably better identified and organized than that of any other major industry.

As editor and research associate in technical bibliography at the Institute, Dr. West was responsible for the editing of all technical and scientific publications and the preparation of all bibliographies. In addition, he was a member of the Policy Committee on all scientific articles emanating from the institution. His prominence in the editorial field had led scientists and technologists in many other fields and from all parts of the world to seek his counsel. In addition to holding memberships in Tappi and the American Chemical Society, he was a senior member of the Technical Section of CPPA and a member of Sigma Xi.

Dr. C. J. West

C. H. Currier

C. H. Currier

Charles H. Currier, 66, chairman of the board of Kewanee-Ross Corp., died December 22 in Buffalo, N.Y. He became chairman of Kewanee-Ross only recently, when Ross Heater & Mfg. Co., of which he was president, joined with Kewanee-Boiler Corp. Twice a president of the Tubular Exchanger Manufacturers Association, of which he was one of the founders, Mr. Currier was also a member of the Engineers' Club of New York City and the American Society of Naval Engineers and Architects.

W. P. Forbes

Wells P. Forbes, 65, superintendent of St. Regis Paper Co.'s West Carthage, N.Y., mill for 25 years until his retirement in 1951, died January 16. He joined St. Regis in 1916 at the Champion plant in West Carthage. Mr. Forbes had also been superintendent of the firm's plant at Oswego.

Albert B. Clark

Albert B. Clark, 62, retired superintendent of the finishing department of Racquette River Paper Co., Potsdam, N.Y., died December 25. He had been a papermaker all his life and was a specialist in the finishing field. Mr. Clark had also been associated with West Virginia Pulp & Paper Co. and Thorold Pulp Co. Ltd. He joined Racquette River 20 years ago.

F. Hayward Johnson

A long time member of the Superintendents Association, *F. Hayward Johnson* of Kennebec Pulp & Paper Co., Augusta, Maine, died May 30, 1952. Known widely throughout the industry as "Sulphite Johnson," he had been in failing health for several years.

W. C. Leonhard

William C. Leonhard, 63, president of Patterson Parchment Paper Co., Bristol, Pa., and also of Theodore Leonhard Wax Co., North Haledon, N.J., died January 7 at his home in Yardley, Pa.

E. R. Lyman

A former president of the Salesmen's Association of the Paper Industry, *Edson R. Lyman,* 68, died January 2 in an Elizabeth, N.J., hospital. He was executive vice president and sales manager of Missisquoi Corp., Sheldon Springs, Vt. A native of Holyoke, Mass., Mr. Lyman had been associated with Missisquoi for 35 years.

William A. Luke Jr.

William Allan Luke Jr., a member of the family that founded West Virginia Pulp & Paper Co., died in Clifton Forge, Va., January 25. A native of Covington, he was 51.

Mr. Luke was a director of the Citizens National Bank of Covington and was associated with several civic organizations. He retired from active business and philanthropic interests three years ago. Mr. Luke's grandfather founded Westvaco, while his father, the late William Allan Luke, was general manager of the Covington plant.

Harvey L. Snyder, 44, assistant foreman at the Milford, N.J., plant of Riegel Paper Corp., died January 24. He had been associated with Riegel for 25 years.

Dr. C. Audrey Richards, for many years chief of the Division of Forest Pathology of the Bureau of Plant Industry, Soils and Agricultural Engineering,

U.S. Department of Agriculture, died January 26 in Madison, Wis. The first woman ever to receive a post of such responsibility in the Bureau, she headquartered at the U. S. Forest Products Laboratory in Madison. Dr. Richards, who had retired less than a year ago, began her career in 1917 as assistant in forest pathology at the laboratories. One of her first assignments was the development of methods of controlling decay and mold in wood pulp.

Alan E. Pradt, 53, advertising manager for Rhinelander Paper Co., Rhinelander, Wis., and former secretary to the late Senator Lenroot of Wisconsin, died recently at his Rhinelander home. He was at one time with Marathon Corp.

Michael F. Dunn, 81, assistant treasurer of Fitchburg Paper Co., died January 19 in Fitchburg, Mass.

William P. Jeffery, of New York, a director of Container Corp. of America for 21 years, died in New York recently. He was best known in the paperboard industry for his work at the time of the N.R.A. period—for the manner in which he led in the drafting of ideal codes of fair competition for the industry, a type of organization which later became the model for practically every industry.

Frederic W. Drake, a representative of Lockport Felt Co., Lockport, N.Y., in the southern states for a number of years until his retirement in 1947, passed away at his home in Pittsburgh, Pa., in December. He was 79.

Louis Weinhagen, 64, one of the founders of Wisconsin Bridge & Iron Co. and former president of A. George Schulz Box Co., died recently in Milwaukee.

Gavin W. Young Jr., vice president and treasurer of Edgewater Paper Co., died January 1 at his Menasha, Wis., home. He had been in poor health for several years. He was 54.

Miln Brocklebank, 69, former general manager of Great Lakes Pulp & Paper Co. Ltd., Fort William, Ont., died January 2 in Toronto.

Thomas J. Finerty, 69, former vice president of Zellerbach Paper Co., died December 31 at San Francisco. He retired two years ago.

Clarence Stewart Moore, 73, vice president of Anderson Paper & Twine Co., Altoona, Pa., died at his home January 4. He had been associated with Anderson 46 years.

NASH ENGINEERING COMPANY
423 WILSON AVE., SO. NORWALK, CONN

The Paper Industry Safety News

Southern Association Reports Accident Rate Down from 1951

THE NINE-MONTH accident frequency rate of member mills of the Southern Pulp & Paper Safety Association was 9.71, down 0.42 from 1951, it was reported by the Association in January. Leading for the three-quarter period was Buckeye Cotton Oil Co.'s mill at Memphis, which reported no disabling injuries in 1,326,452 man-hours of exposure.

Of the 55 reporting mills, six in addition to Buckeye had rates of less than 2.0. They were: Ecusta Paper Division of Ecusta Paper Corp., Pisgah Forest, N.C., 0.55; Gulf States Paper Corp., Tuscaloosa, Ala., 0.85; National Gypsum Co., Mobile, Ala., 1.29; Champion Paper & Fibre Co., Canton, N.C., 1.85; National Container Corp., Jacksonville, Fla., 1.92, and the Hummel-Ross Division of Continental Can Co., Inc., Hopewell, Va., 1.96.

In the bag plants division, Gulf States Paper Corp. at Tuscaloosa led with a frequency rate of 0.0 in 793,230 man-hours of exposure. Other leaders in the division included Hudson Pulp & Paper Corp. at Palatka, Fla., and International Paper Co. at Mobile. The over-all rate in the division for the first nine months was 8.82, as compared with 12.12 for the entire year of 1951.

Among box plants, Union Bag & Paper Corp. at Savannah, Ga., reported a rate of 1.12. For the four box plants in the Association, the over-all rate was 12.30. The 1951 rate was 9.39.

Three firms reported no disabling injuries in their woods operations. They were St. Regis Paper Co., Pensacola, Fla.; Rayonier, Inc., Fernandina Beach, Fla., and The Mead Corp., Lynchburg, Va. The over-all rate for nine months was 12.00, as compared to 1951's rate of 49.29.

Conveyor Safety Rules

Ten rules of safety in the operation of conveyors were presented at the 40th National Safety Congress in November at Chicago by Jervis C. Webb, executive vice president and general manager of Jervis B. Webb Co., Detroit. Speaking for Conveyor Equipment Manufacturers Association, Mr. Webb stressed the following points:

(1) Never put a conveyor system into operation until it has been formally turned over by the manufacturer; (2) be sure drive machinery is guarded; (3) keep lubrication piped to safe points; (4) provide adequate clearances for maximum loads; (5) consider visibility in locating controls and in loading; (6) confine operation of conveyors to authorized employes; (7) leave repair to maintenance employes; (8) provide a smooth cover under slat conveyors to avoid shearing; (9) insist on no riding and no stepping on conveyors, and (10) instruct employes in loading to consider clearances, visibility, protruding hazards, and the danger of tumbling.

LongLac Reports Success of "Human Element" Program

Beaming its comprehensive safety program toward the "human element" has paid dividends for LongLac Pulp & Paper Co., Ltd., at Terrace Bay, Ont. This was shown in a report released in January by Fred O. Soughton, the firm's services and safety supervisor.

Demonstrating that 1952 was by far LongLac's safest year, the report stated that only three employees suffered on-duty disabling injuries, with a total of just 20 lost work-days involved. The frequency rate of 2.15 was a 38 per cent improvement over 1951. The severity rate improved 87.5 per cent, and doctor-care cases were reduced 48 per cent.

The two major objectives set up by LongLac at the first of the year were achieved. The frequency rate objective of 2.5 was bettered by 14 per cent, and the goal of 1,000,000 safe man-hours was bettered by 45,000. The latter was recorded during the period between March 28 and December 22, during which an average of 650 persons worked 269 safe days.

Frequency rates for the past five years are as follows: 1948 (during which the mill was under construction until the start-up in November—22.36; 1949—13.76; 1950—5.91; 1951—3.48, and 1952—2.15. In the safety contest between LongLac and Spruce Falls Power & Paper Co. Ltd. at Kapuskasing, the former's rate of 2.15 won out over the 5.90 recorded by Spruce Falls.

Case analyses

Tuesdays and Fridays were shown to be the most "dangerous" in one of the case analyses made by the LongLac safety staff. The daily percentage records were as follows: Monday, 15; Tuesday, 21.3; Wednesday, 10; Thursday, 15; Friday, 21.3; Saturday, 8.7; Sunday, 7.5, and not known, 1.2.

Analysed by age groups, the following data was obtained in relation to the respective percentages of doctor-care and lost-time injuries: under 20 years, 5; 20-25 years, 27.5; 25-30 years, 26.3; 30-35 years, 15; 35-40 years, 11.3; 40-45 years, 10; 45-50 years, 1.2, and over 50 years, 3.7.

Injury types

During 1952 the number of the various types of injuries were as follows: foreign bodies, 14; contusions, 20; lacerations, 9; strains, 7; slivers, none; infection, 1; dislocations, none; punctures, 7; abrasions, 3; bodily reactions, none; burns, 5; chemical burns, 7; sprains, 6, and welding flash, 1.

The eyes were the body part most involved in the doctor-care and lost-time injuries. Other parts frequently involved included the hands, fingers, arms, stomach, chest, back, head and face.

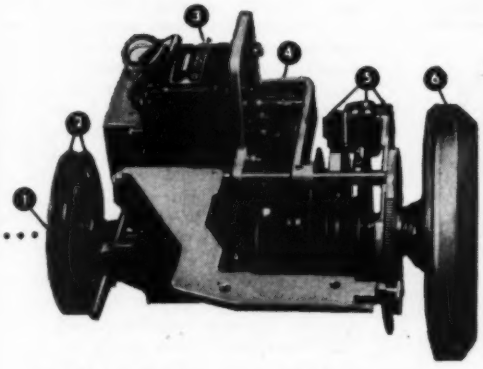
Accident types

Workmen struck by falling, flying or moving objects led in the accident types with 22 injuries reported. Others were: struck against, 10; caught between, 4; handling material, 10; slipping, 3; falling, 5; moving machinery, none; contact with hot substances, 4; contact with hot objects, 1; contact with chemicals, 7; inhalation of fumes, none; radiation, 1, and insect, 1.

1953 goals

In the report, Mr. Soughton set down the objectives for 1953: "Our new theme, 'Let's be Accident-Free in '53,' provides a real challenge. If it is to become a reality, we must continue to generate a steady pressure at all times which will maintain the safety consciousness now prevailing. To do this, we must all study and utilize both old and new approaches during the year. We must also relentlessly pursue every hazard (both 'mechanical' and 'human') and deal with it promptly. Nothing less than the maximum of thought and effort on the part of everyone will be sufficient if accidents to LongLac people are to be reduced to an absolute minimum."

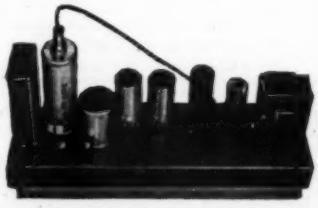
1. Center line of slidewire and shaft
2. Control cams
3. Balancing motor
4. Spring-loaded no-backlash drive
5. Control slidewires
6. Measuring slidewire



POWER IS PERFORMANCE

... and Speedomax Instruments lead with "huge" 12-watt balancing motors!

This partially dis-assembled view of Speedomax shows its two-phase Balancing Motor and gears, with a typically "heavy" load of slidewires and contacting cams for signal and control devices. Several more cams, etc., can be added if necessary; only practical limit is physical space on shaft. Smoothness in operating many contacts is an outstanding Speedomax ability.



Amplifier which feeds the Speedomax balancing motor the controlling half of its power. Torque gradient is especially high where needed most—around balance point—for prompt, positive balancing. This Amplifier leads its field by large margins in sensitivity and in power output.

Good circuit engineering shows in this Slidewire's non-inductive wiring and in the absence of any flexible leads which might form inductive loops.

• Power underlies good performance, in instruments as in automobiles, machine tools or rolling mills. That's why L&N engineers insist that an automatic instrument should operate as positively and promptly as any other high-grade machine.

Even the first null balance potentiometer Recorder we built, back in 1911, which went to a steel mill, had a 110-volt motor instead of a spring drive to run its balancing mechanism, chart and signalling contacts. And, while its pioneering of balance-method measurement attracted the most attention, its ample power certainly helped establish L&N Recorders as the coming idea in process Instrumentation.

Power has done the same for Speedomax instruments. Twenty years ago, Speedomax pioneered the electronic idea of measurement—in a husky, powerful piece of equipment. Today's models have from 2 to 4 times more power in their balancing motors than any other current models of electronic controllers, recorders or indicators.

This power means superior performance in both load-carrying and speed. Load-carrying ability applies especially when the motor operates, in addition, an unusual number of contact devices. But even the most usual Speedomax jobs—automatic control, for instance—can call on the instrument's power for high operating speed in handling the normal number of control devices. The strong, wide-faced, rigidly-mounted cams and gears so typical of Speedomax instruments start moving instantly, move rapidly and stop dead still without coast. Signalling and control action is correspondingly crisp and precise.

Speedomax for industrial use is described in Catalog ND46 (1); additional information for unusual applications is given in Technical Publication ND46(1). Either will be sent on request by our nearest office or from 4974 Stenton Ave., Philadelphia 44, Pa.

LEEDS LN NORTHRUP

instruments automatic controls • furnaces

CAREER OPPORTUNITIES AT L&N

Expansion program of this long-established firm has many features to attract outstanding recent graduates in engineering and science. Opportunities are in sales field engineering, product and application engineering, research, advertising, market development. Widely-respected policies assure recognition of progress and achievement. Address Personnel Manager for preliminary interview at nearest of 17 L&N offices.

Jrl. Ad. ND46(8)

Foreign Abstracts . . . . . .

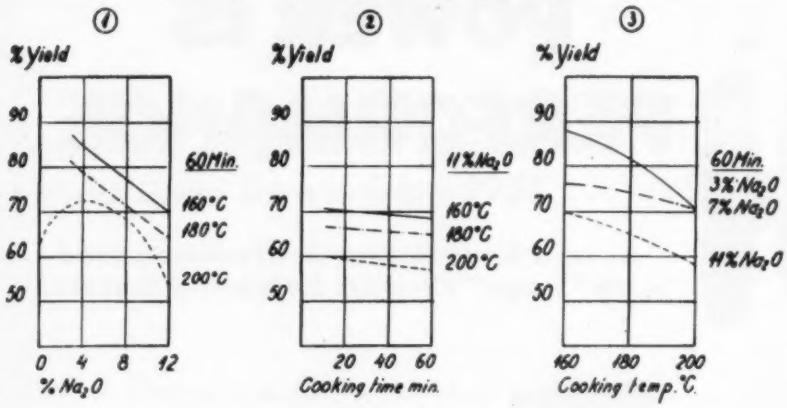


Figure 1

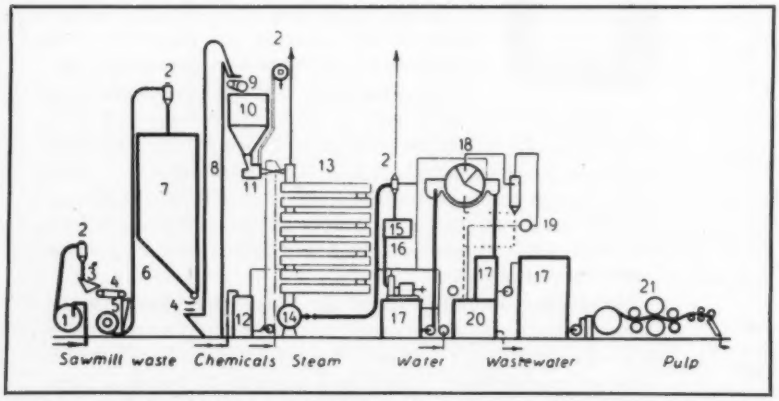


Fig. 2—Layout of a Veitsiluoto semichemical pulp mill showing: (1) chipper; (2) cyclone; (3) chip screen; (4) belt conveyor; (5) chip feeder; (6) pneumatic conveyor; (7) chip bin; (8) chip elevator; (9) magnetic separator; (10) chip hopper; (11) screw feeder; (12) chemicals; (13) reaction chamber; (14) Asplund defibrator; (15) refiner box; (16) Sprout-Waldron refiner; (17) pulp storage; (18) washer; (19) vacuum pump; (20) waste water; (21) Kamyr

Semichemical pulp from sawmill waste

The semichemical pulping processes which have gained preëminently elsewhere have not been pushed to the same extent in Scandinavian countries. The present article deals with extensive experiments carried out with semichemical pulping of spruce and pinewoods in the Finnish Veitsiluoto mills. The work was stimulated by the fact that in Northern Finland, where the wood growth cycle is about 90-100 years, large amounts of wood suffer loss by deterioration annually. This leads to "second grade" wood which could serve as raw material for semi-chemical pulp manufacture.

The initial experiments were carried out with unbarked sawmill waste and approximately 2500 laboratory cooks were made, in which cooking conditions were varied widely, the time varying from 5 to 60 minutes, and the temperature from 130° to 200°C. The bark content varied from zero to 24 per cent. Both acid and alkaline cooks were made. At higher temperatures, and with low chemical concentrations, irrespective of pH, widespread hydrolysis occurred. Fibers were destroyed, yields reduced, and strength and color of the pulps suffered materially. A relatively strong pulp, light in color, could be produced in less than an hour by effectively pre-soaking the chips. Pulps produced by cooking with caustic soda alone, require high refining energies, which are, to a certain extent, contingent on the lignin content. To insure a good grade of semichemical pulp from softwoods, thorough pre-soaking was required, and the pH during the entire digestion was held slightly on the acid side. [In a number of experiments sulfur dioxide was used together with sodium salts, in the digestion].

The Veitsiluoto mill has now produced pine semichemical pulps from unbarked mill waste in yields of 65-67 per cent, to the extent of 40 tons *per diem*. The product went largely into roofing felts. Cooking conditions were approximately as follows: temperature 192°C, held for 23 minutes; cooking pressure 13.5 atmospheres. The consumption of chemicals was 10-12 per cent (calculated as Na_2O, based on oven-dried wood). The steam consumption was one ton per ton of wood, and power consumption was 250-350 kilowatt hours per ton (based on 90 per cent dry pulp). Strength tests on such pulp, beaten 0.75 hour to 50 deg. Schopper-Riegler, indicated that the quality was reasonably satisfactory. Although semichemical pulp prepared as outlined above is not considered a high-grade product, it can (for certain purposes at least) compete with products made from raw materials of higher quality.

A series of graphs in which yields are plotted against Na_2O (or SO_2), cooking time, or digestion temperatures are given. Such a series is shown in Fig. 1. Fig. 2 shows the layout of the mill. Thirteen illustrations (largely graphs) are included. Heikki Sihtola (Mill manager). *Paper and Timber* (Finland), **34**, 409-418 (1952). (Original in Finnish, with English summary.)

Influences of moisture on kraft pulp quality

Laboratory kraft cooks are made with moist and with dry Swedish pinewoods. The wood samples are soaked or dried, both as logs and in the form of chips. From his laboratory data, the author draws the following conclusions: provided the wood is moist when it enters the digester, the same pulp yields and pulp quality obtain irrespective of whether or not the wood has been dried prior to moistening. In other words, naturally moist wood or wood that had been dried and then moistened give similar results. The moisture content of the wood on chipping has no bearing on the result (provided the chips are moistened subsequently).

If the wood is dry and not steamed, the strength of the resulting pulp is somewhat lowered than in the case of moist wood, but the drop in strength is slight. Dried wood apparently gives a higher percentage of screenings. If dried wood is treated with steam prior to charging the digester, pulp yields and quality compare favorably with those of moist wood. The author warns, however, that under mill conditions the results may be less clear-cut. C. Valeur. *Svensk Papperstidn*, **55**, 776-783 (1952). (Original in Swedish, with English summary.)

Sulphite spent liquor for use in the neutral sulphite semichemical cook

Chemicals which are required for neutral sulphite cooking are dissolved in calcium or sodium bisulphite waste liquor. By evaporating and burning this neutralized sulphite waste liquor, the combustible organic matter and the sulphur may be utilized. A soda melt is dissolved in sulphite waste liquor and treated with stock gases containing carbon dioxide. This gives rise to hydrogen sulphide, which in turn can be oxidized to sulphur dioxide. The latter

COCHRANE CHEMICAL COMPANY

specialists in quality

WAXES

For the paper and insulating trade.
Laminating, Paper Coating, Saturating.
Wax concentrates—Heat sealing waxes.
Moisture vapor resisting waxes, Petrolatums, wax emulsions.
Dip-coating (conforming to Army-Navy specifications).
Special blends for paper converting.

Write for catalog

COCHRANE CHEMICAL CO.

151 Main Street

Matawan **New Jersey**

COMPLETE
Nation-Wide
SERVICE

- **DESIGN • INSTALLATION**
- **MAINTENANCE • REPAIR of Corrosion-Resistant TILE TANKS and LININGS**

SINCE 1884
Specialists in Design Installation and Servicing of Linings and Tile Tanks

Working with a complete range of corrosion-resistant materials — such as acid brick, tile, carbon brick, Saran-Rubber and Tygon — our design engineers and skilled installation men are qualified to meet practically any chemical and physical conditions.

Merely outline your requirements for a *practical* recommendation from the Stebbins man in your territory.

SEMCO

STEBBINS

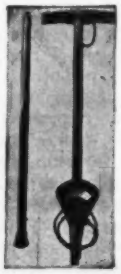
Engineering and Manufacturing Company, Watertown, N. Y.

STEBBINS ENGINEERING CORP. — TEXTILE TOWER, SEATTLE, WASH.
CANADIAN STEBBINS ENGR. & MFG. CO. LTD. — CASTLE BLDG., MONTREAL, CANADA

IT'S TEMPERATURE

THAT CONTROLS DRYING

Every paper mill man knows that water-logging, inside film or air-binding can cause a wide variation between the inside and the outside temperatures of drying rolls. And it's the surface temperature on the outside of the rolls that dries the paper. You can locate any off-temperature roll in the train quickly and easily with a Cambridge Surface Pyrometer. This accurate, convenient instrument may be used on still or moving rolls. The convenient Extension Model enables you to reach both nearby and inaccessible rolls.



Send for Bulletin 194SA

Cambridge Instrument Co., Inc.
3701 Grand Central Terminal
New York 17, N.Y.

CAMBRIDGE
SURFACE PYROMETERS

can then be used in sulphiting the carbon dioxide-treated liquor or can be returned to the sulphite pulp mill.

In laboratory digestions, a good grade of semichemical pulp from birch and pine could be prepared in yields of about 72 and 69 per cent, respectively. A patent has been applied for. Nils Mannbro. *Svensk Papperstidn.*, **55**, 665-667 (1952).

Bamboos: silviculture and management

Special attention is given in this article to the silviculture and management of *Dendrocalamus strictus*, the male bamboo used extensively in the paper industry and widely distributed in India. This is the hardiest of Indian bamboos. It grows under conditions of greatly varying rainfall (30 to 200 inches) and under extreme temperature conditions (22 to 116° F.). The soil type in which it grows apparently is unimportant.

The culms (in their various forms are fully described), and the flowering cycles in various areas are referred to. The bamboos can be raised (preferably) by separated rhizome planting, by sowing the seed (which has an 80 per cent germinative capacity) or by means of transplants. Bamboo "forests" are often worked on a three year felling cycle but cuttings may be taken in two to four years. Experiments with varying felling cycles are described. Culms in good condition (after removal of dead growth) have been observed at the physical age of fifteen years. The importance of scientific management of bamboo forests is stressed. V. S. Krishnaswamy. *Indian Pulp and Paper* (Anniversary Number), **7**, 61-2, 64, 66-67 and 69 (1952).

Suitability of cellulose for the manufacture of its derivatives

Although various pulps which have identical alpha-cellulose contents and which show few analytical differences can be prepared readily, they may differ widely with respect to their suitability in the manufacture of cellulose derivatives.

Properties which are of supreme importance are *reactivity* and *accessibility*. The former deals with chemical kinetics, whereas the latter is concerned with the amount of cellulose that can react *readily* to form derivatives. In the past, the term "reactivity" has been used rather loosely, and the present author seeks to remedy this. Reactivity is not a property to be expressed in absolute units, but comprises the conditions observed and measured during the course of a chemical reaction. Three factors are involved in reactivity, namely, the *average rate of reaction*, the *rate distribution*, and *sensitivity*. The average rate of reaction is only determined for the readily accessible portion of the cellulose (*i.e.*, until the reaction comes *almost* to a standstill).

From a typical graph, the author develops mathematical expressions for rapid and slow reactions, and such a graph is shown in Fig. 1. Here the fast reaction is No. 1 and the slow reaction is No. 2; and, in either case, the average rate can be determined by measuring (or calculating) the areas A_1 and A_2 under the curves dR_t/at from zero time (T_0) to T_1 and from T_0 to T_2, respectively. To express rate of reaction numerically, the term *rate distribution* has been developed. Referring again to Fig. 1, this rate distribution is A_1/H_1 (or, in the slower reaction) A_2/H_2.

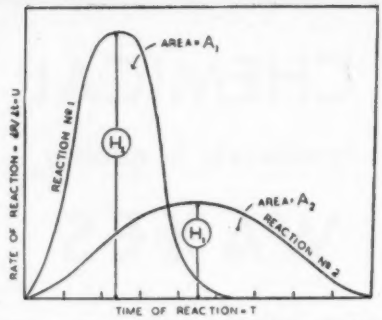


Fig. 1—Change of the rate of reaction with time

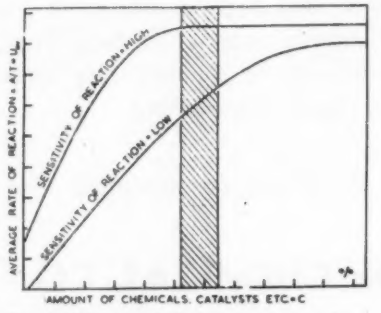

SENSITIVITY OF REACTION = HIGH
SENSITIVITY OF REACTION = LOW
AVERAGE RATE OF REACTION = ΔT/Δt = U
%
AMOUNT OF CHEMICALS, CATALYSTS ETC = C

Fig. 2—Change of the average rate of reaction with the amount of chemicals, catalysts, etc. Concentrations under actual manufacturing conditions are found within the hatched area

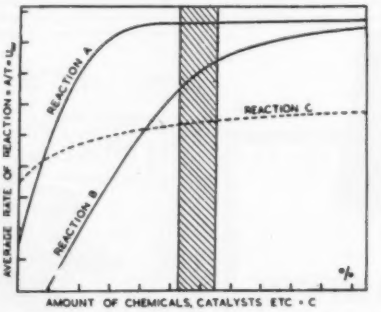


Fig. 3—Sensitivities of various reactions. Actual manufacturing conditions are found within the hatched area

The term *sensitivity*, which is one component of reactivity, is that change in average rate of reaction caused by changing such experimental conditions as concentrations of chemicals, amounts of catalyst used, *et al.* Apparently a cellulosic material should show as *small* a sensitivity as possible (a fact which does not seem to be generally recognized by the industry). Fig. 2 shows how two reactions depend on the amounts of chemicals present. Ordinarily the average rate of reaction increases with improved experimental conditions until a final constant value is reached. However, the *sensitivity* is not the numerical value of this, but the actual change of the average reaction rate with the change in experimental conditions. The sensitivity of each of the two reactions was plotted in a graph not shown in this abstract. The sensitivity of one reaction was high at the start but reached zero rapidly. The other reaction showed some sensitivity almost throughout the entire range. In actual manufacturing practice a (chemical) concentration range is that shown between the hatched areas (of Fig. 2). In Fig. 3, curve A shows (under manufacturing conditions in the hatched area) a high average rate of reaction and no sensitivity. Reaction B has a higher average rate of reaction than has C. Whereas C shows almost no sensitivity, B shows a marked sensitivity. Thus, despite its lower reaction rate, the pulp in C would be preferred to that in B.

Accessibility (unlike reactivity) can be defined in experimental terms and is discussed at some length. The author defines three different terms: (1) the ratio of amorphous to crystalline regions as determined by x-ray and density measurements; (2) *relative accessibility* as determined by hydrolysis methods, oxidations, exchange of deuterium oxide, etc. (this portion of the cellulose corresponding in most cases to the amorphous portion *plus* the surface of the crystallites); and (3) *total accessibility*, determined by measuring the degree of substitution and the solubility of the derivative formed, the amount of microgel, undissolved particles, and the turbidity of the dissolved derivative.

All of the factors mentioned above were not generally determined. In most cases only the *average rate of reaction* and *total accessibility* were noted. Total accessibility cannot be improved by any simple means, and when low, may be due to the formation of cross-linkages that are not split in the ordinary manufacturing processes. Thus, total accessibility may actually be the most important property of a commercial cellulose. Even if the other properties are excellent, low accessibility can mean that the value of cellulose for manufacturing derivatives may be poor. The author feels that methods for determining total accessibility should be internationally accepted. Twenty references. Karl Borgin, *Norsk Skogindustri*, **6**, 373-378 (1952). (In English.)

The Indian pulp and paper industry in 1951

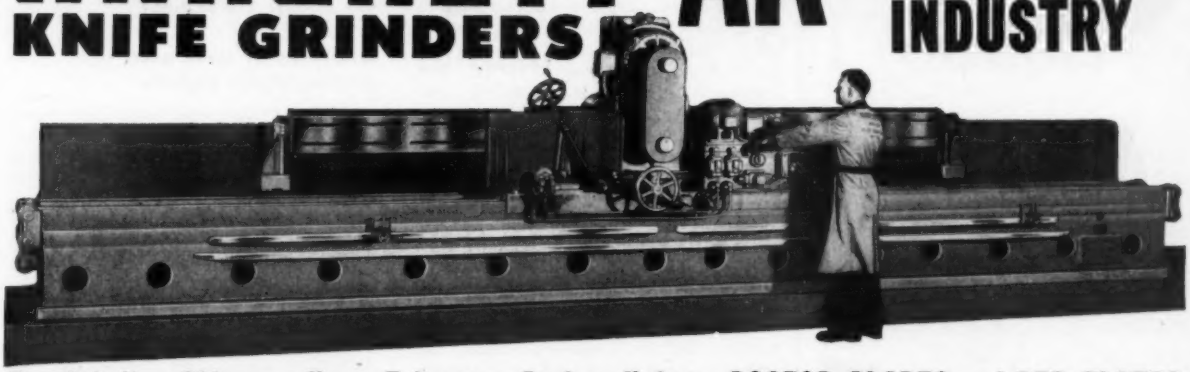
Paper mills in India reached an actual production figure of about 128,450 tons in 1951 (as compared with 108,907 tons in 1950). The production capacity was increased to 158,500 tons. Per capita paper consumption is extremely low in India.

The article discusses raw materials used in the paper industry, which are largely bamboo and the other grasses. About 22,000 people are employed in the Indian paper industry. The output per man hour in India is possibly the lowest in the world. No very serious labor or transport difficulties were experienced in 1951.

The Andhra mill (taken over by the Madras government) gave no production figures for 1951. The Bengal Paper Mill Company, Ltd. produced nearly 18,000 tons of paper and board (using some imported wood pulp). The Deccan Paper Mills Ltd. produced 4,000 tons; the Gujarat Paper

HANCHETT AK KNIFE GRINDERS

FOR THE PULP & PAPER INDUSTRY



For Grinding Chipper—Hog—Trimmer—Barker Knives, DOCTOR BLADES and BED PLATES

SPEEDS: 10′ to 100′—30′ to 150′ and Faster
MOTORS: 7½ H.P. to 40 H.P.
WEIGHTS: 10 Tons up to 40 Tons
CAPACITY: 84″ to 360″ and longer

AK grinds FLAT or CONCAVE BEVEL on any desired angle or square. Available with either cylindrical or segmental type wheels. For high speed—accuracy—choose AK!

Mechanical or Hydraulic Head Carriage Drive—Heavy Duty Massive Construction—Accurate High Production —Fine Finishes.

—OTHER MODELS—

DN 32″ to 108″ Knife Capacity

GK 32″ to 184″ Knife Capacity

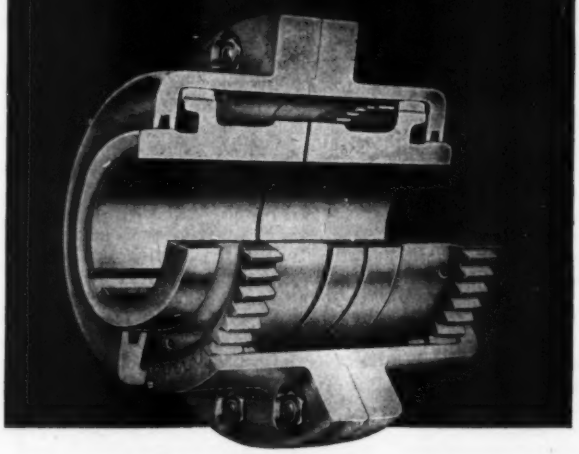
Tell us your knife problems. Our engineers may have a money-saving solution for you. Write Dept. PI-23.

HANCHETT MANUFACTURING COMPANY

World's Largest Manufacturer of Saw Sharpening and Knife Grinding Machinery

Main Office: Big Rapids, Mich. — West Coast: Portland 4, Ore.

POOLE



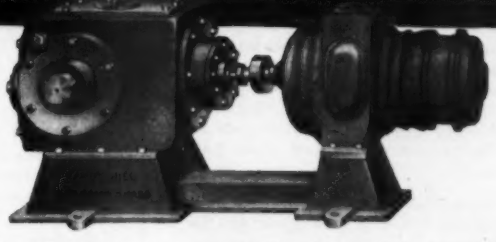
A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY — WOODBERRY, BALTIMORE, MD.

Check these Superior Features of

Sandy Hill Bertrams Shake



- The last word in Fourdrinier Shakes, the Sandy Hill BERTRAMS gives a perfectly horizontal motion. It is the only shake that gives a full harmonic motion.
- The length and number of strokes can be varied from zero to maximum while the machine is in full motion, resulting in extremely accurate control of sheet formation on the wire.
- No friction problem because all working parts are totally immersed in oil.

Write for illustrated folder

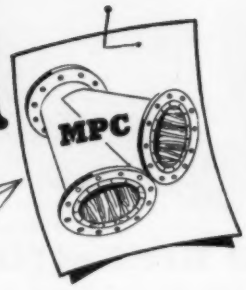
The *Sandy Hill* IRON & BRASS WORKS

PAPER MACHINERY SPECIALISTS • HUDSON FALLS, N. Y.

Associated with Canadian Vickers, Ltd., Montreal, Builders of Sandy Hill Designed Machinery in Canada

Q *what pipe is especially designed to lick the corrosion problem?*

A



WOOD-LINED STEEL PIPE

It's as simple as this:

. . . if your piping problem is corrosion, abrasion, frictional resistance or sliming

. . . if you're looking for a dependable, efficient and economical answer to this problem

then specify MPC WOOD-LINED STEEL PIPE, the pipe that combines the strength of steel with the durability of wood!

For service up to 180°F and 250 P.S.I. Higher pressure ratings for special service requirements. All pipe flanged and available in 10' and 20' standard lengths, or "tailor-made" to your specifications. Easily cut and reflanged; all flanges have standard ASME bolt circles.

Wood-lined fittings are available in standard and special designs for all diameters. For catalog and additional information, write Dept. P.I.

It's as easy as MPC
to lick your pipe corrosion problem!

mpc
MICHIGAN PIPE COMPANY
Bay City • Michigan
Manufacturers of Wood-Stave, Saran Rubber-Lined, Stainless Steel and Monel Piping. Represented nationally by Saran Lined Pipe Co., Detroit, (Ferndale) Michigan.

Mills Ltd. produced 4,000 tons; India Paper and Pulp Company, Ltd. made over 8,000 tons (using the sulphite process); Mysore Paper Mills Ltd. produced about 4,000 tons. The Orient Paper Mills Ltd., which has the largest single production unit in India, has a capacity of over 100 tons per diem (actual production figures are not given); the mill produces kraft. The Punalur Paper Mills, Ltd. produced 3,899 tons in 1951.

Other mills which are listed include: Rohtas Industries Ltd. (which utilizes bagasse) for which no production figures are given; Pudokotah Paper Mills Ltd. (first operating in 1951, using palmyra stalks and manufacturing wrapping paper) which gave no production figures; Shree Gopal Paper Mills Ltd. which made 10,280 tons; Star Paper Mills Ltd., which had a low production (not given) due to labor troubles; and the Sirpur Paper Mills, Ltd. which produced 5,200 tons. The latter is now under the management of the Hyderabad government.

The mills with the largest actual production (almost 40,000 tons) are the Titaghur Paper Mills Company, Ltd., manufacturing coated art paper and imitation art papers. The Tribeni Tissues Ltd. mills went into production in 1951, using sunn hemp as raw material. Attempts to make satisfactory cigaret paper were not too successful. No production figures are given. The paper may find a use as air mail paper.

The same article also briefly outlines production in the rayon industry. Anon. *Indian Pulp and Paper*, **7**, 17-23 (1952).

Flow of pulp suspensions in pipes

The authors undertake a rheological analysis of pipe flow data for pulp suspensions. After reviewing the literature (with twenty references) and some of the basic concepts of rheology, they have attempted to analyze the "pipe flow curve" in which V/2R is plotted against τ_R, in which V is the average linear velocity, R = pipe radius, and τ_R = shear stress on the wall of the pipe.

The stocks referred to are sulphite and groundwood. For laminar flow of homogeneous materials in long, horizontal pipes, and in the absence of "slippage flow" at the pipe wall, experimental data (referring to the flow of a specific material in pipes of different diameters) should give the same $V/2R,\tau_R$ graph irrespective of pipe diameter. However, available data seem to indicate that there is a systematic diameter effect in these curves. The reasons for this effect are discussed. The following are possible, partial explanations: presence of large experimental errors; non-linear pressure gradiants; slippage flow; and/or the heterogeneity of the suspensions.

Methods for distinguishing between laminar and turbulent flow are also discussed. It appears that heavy suspensions in general flow laminarily. From their results, the authors confirm the opinion that pulp suspensions from the flow point of view must be considered very complex materials and that there is need for far more reliable experimental data. Future research should be directed towards finding a theoretical basis for the many empirical methods of correlation suggested in the literature.

The engineering terms used in the paper are clearly defined, and eight graphs are included. Hans Palmgren and Bengt O. A. Hedström. *Svensk Papperstidn.*, **55**, 691-699 (1952). (In English.)

Analyses of sizes used in photographic papers

Assuming that four types of sizing agents may be present in photographic papers, the author outlines a scheme of qualitative analysis, which in the future can probably be made quantitative. The common sizes referred to are rosin (I), gelatine (II), casein (III) and melamine resins (or other nitrogenous resins) (IV).

By refluxing the paper sample with ethanol containing a small amount of glacial acetic acid, I is removed and may be tested for in the evaporated, dried extract by the Liebermann-Storch reaction. The latter involves treatment with acetic anhydride and a drop of sulfuric acid, which results in a play of colors, red veering through violet to greenish brown, which is characteristic of resin acids.

After the removal of I, the residual paper sample is boiled with water containing an acetate buffer which keeps the system at pH 4 to 4.5. This prevents solubilization of III, and permits the extraction of II. The gelatine solution (V) is then hydrolyzed with hydrochloric acid (at pH 1), and the resulting amino acids are tested for by the well-known ninhydrin color reaction (which gives a blue coloration due to the formation of an ammonical condensation product).

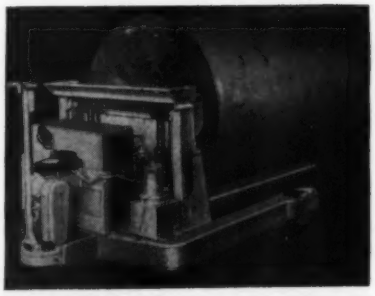
II in V may be determined by precipitating II with cold tannin solution and determining the nitrogen in this precipitate by the Kjeldahl method. A difficulty in the analysis is presented by the fact that if small amounts of II remain in the paper *after* removal of V, these may be mistaken for III.

However, III is a phosphoprotein, from which the phosphoric acid can be removed. III is first extracted from the (II-free) paper by an aqueous solution, buffered with NH_4OH and NH_4Cl to pH 10. The extract is then evaporated and ashed at low heat, and the phosphates determined (or tested for) in the presence of nitric acid and ammonium nitrate as the insoluble phosphomolybdate. Although III contains only about 0.8 per cent phosphorus, the method has been found satisfactory.

After extraction of III, IV is dissolved out of the paper sample by boiling with glacial acetic acid. This extract is evaporated to dryness and the stable IV heated *in vacuo* to 300°C. Under these conditions melamine sublimes in the form of characteristic rhombohedra, which (in acetic acid) show a marked greenish-yellow phosphorescence in ultraviolet light.

The author also discusses the physical tests used in determining the degree of sizing. These include the capillary rise in a paper strip and electrical methods. After critical evaluation the conclusion is reached that none of these is too satisfactory. However, further studies in the field of physical testing are imperative. Fourteen references are given. R. Sève. *Papeterie*, **74**, 715-21 (1952). (In French.)

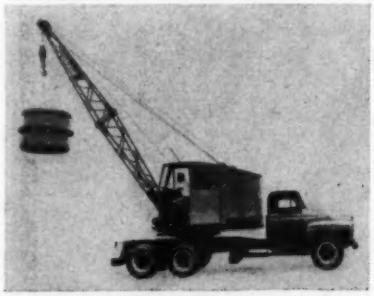
The Paper Industry New Products



Lift truck

A new lift truck especially designed for handling paper rolls, designated as Model SCB, can be used for box car unloading as well as general factory and warehouse use.

The truck is powered by an 18 volt battery power unit and has an 8-ft. load length. Maximum hydraulic lift is 14 in. Ten inch and 7 in. dual load wheels eliminate the hazard of one set becoming wedged in floor slats. Its travel speed loaded is 2½ mph, unloaded 3 mph. "Dead man" controls are standard, with automotive-type brake applied to the drive wheel. The truck is of all welded construction and is designed as a "Walkie" to afford minimum turning radius. *Moto-Truc Co., 1981 East 59th St., Cleveland 3, Ohio.*

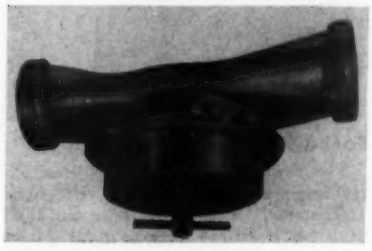


Truck crane

A new six-ton truck crane, designated as Lorain Model TL-10, consists of a complete superstructure equipped as lifting crane which can also be used as a ⅜ yd. dragline or clamshell. It is designed primarily for field mounting on a suitable truck; however, it has many other applications, such as mounting on piers, barges, bins, ships, docks, trailers, flat cars, etc.

This truck crane is a two-drum, gasoline-powered machine fully equipped with a 25 ft. two-piece, butt-flange connected boom. Center sections can be obtained to extend the boom to 45 ft. Tagline for clamshell service, fairlead for dragline service, precision power boom lowering device and other extras are also available.

While the "TL-10" is designed for light-duty crane work when mounted on an ordinary commercial-type truck, it is of heavy-duty construction throughout, with drop-forged turntable rollers, machine cut teeth on ring gear, machined flanges for turntable rollers and 3 in. wide shoe-type clutches. No laggings are required on the two 12-in. pitch diameter hoist drums that hold 200 ft. of ½ in. cable each. The 8-in. pitch diameter boom hoist drum has a take-up reel for reeling by power and storing up to 100 ft. of excess hoist cable resulting from change of boom lengths, eliminating necessity for floating harness. *Thew Shovel Co., Lorain, Ohio.*



Magnetic trap

A newly designed magnetic trap is now being marketed. This "full flow" trap has increased trapping action and is non-agitating to the product in the process lines.

The trap features a "grid" type magnet having four or six pie-shaped segments, depending on its size. This construction offers four or six magnetic gaps across which material can be trapped, as well as across the center of the magnet in any direction. The new "grid" design is an improvement over the previous use of the horseshoe-type magnet that had only one magnetic gap for trapping foreign metal.

The trap's streamlined body design, which is wider and flatter, brings the product closer to the magnet at a decreased velocity, thus aiding the trapping action and reducing product agitation. *Tri-Clover Machine Co., Kenosha, Wis.*

Hard waxes

Two imported waxes recently available for distribution in the United States are Warop Superhard and Extrahard. They are non-toxic, high molecular weight hard waxes, microcrystalline in structure. Superhard has a melting piont of 216° F., penetration of 1; Extrahard has a melting point of 203° F., penetration of 3 to 5. Both waxes have a pure white color.

Due to their exceptional hardness, these waxes impart exceptional gloss and gloss retention. Their resistance to moisture is said to surpass all natural waxes and other refined waxes now in use. *Wax & Rosin Products, 42 Broadway, New York 4, N. Y.*

Pump

The Dudley V-9 pump is of the positive displacement type for water, brine, oil, gasoline and chemicals. The Model 100 delivers from 2.4 gpm to 7.2 gpm at pressures from 9 psi (20 head ft.) to 433 psi (1000 head ft.), depending upon the speed at which it is operated and the power applied.

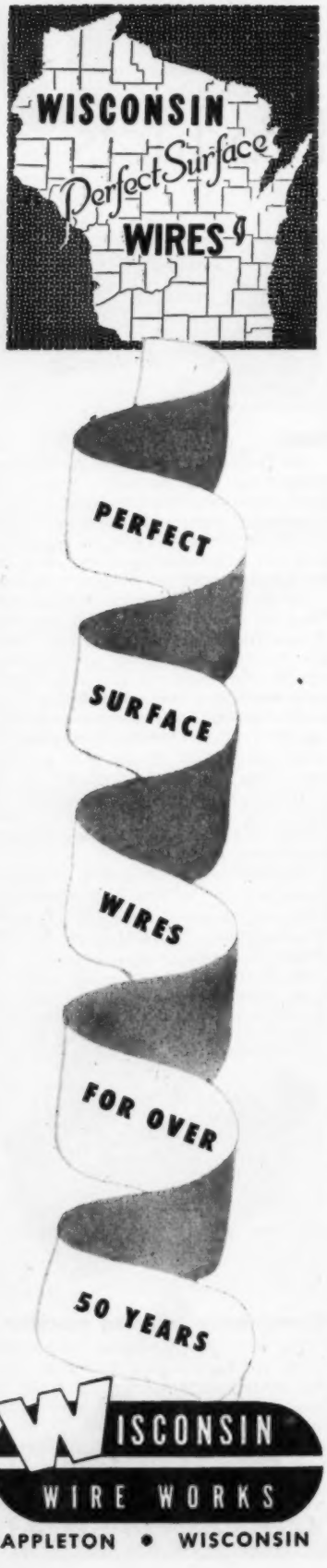
An entirely new principle is employed. There are 9 sleeves which extend into each of two cylinder blocks whose angular relation to each other causes a telescoping cylinder effect when the cylindrical blocks are rotated. There are no connecting rods, cams or springs. No lubrication is required, regardless of the type of fluid being pumped. There are only 12 moving parts and the total pump assembly is comprised of 15 parts. Because of its design, utilizing 9 telescoping cylinders per revolution, this pump is said to give smooth flow with minimum pulsation.

The shaft seal is designed to take inlet pressures to 200 psi. Operating temperature range is from —60° F. to 165° F. *Eastman Pacific Co., 2320 East Eighth St., Los Angeles 21, Calif.*

Combination grinding machine

The new double purpose, combination bench grinding machine, known as Type EE, handles machine knives up to 22 in. long and has attachments to handle gumming of circular saws up to 20 in. in diameter, drills up to 1 in. in diameter, or tools.

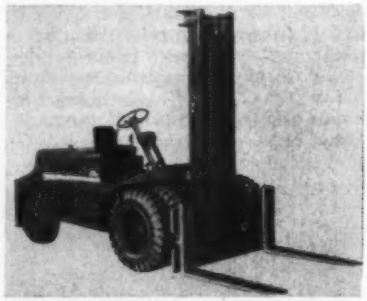
Both operations have a separate grinding wheel which runs independently of the other, yet is powered by the same 1 h.p. special ball bearing motor. On the knife



side of the grinder, the action is completely automatic. The "EE" handles straight or concave bevels and thick, thin or square edges.

For tool grinding, an 8 in. diameter, ¾ in. wide wheel is provided. It operates off the same motor, yet independently if desired. A tool grinding post is attached firmly to the machine. Attachments are available for saw gumming and drill grinding. Special wheels are provided for these operations.

Attachments for wet grinding can be provided to supply coolant to the grinding contact. When dry grinding is required, an exhauster can be installed. A floor pedestal with rollers can also be provided. *Samuel C. Rogers & Co., 185-201 Dutton Ave., Buffalo 11, N.Y.*



Fork-lift truck

The new Yardlift-100 is the latest addition to the Clark line of fork-lift trucks. This sturdy, gas-powered, pneumatic-tired truck has a 10,000 lb. capacity at 24 in. load center and is designed for heavy-duty high-tiering under difficult outdoor conditions.

This truck is powered by a Continental engine producing 55 brake horsepower at 2000 rpm. and a traveling speed of 17.8 mph. It is exceptionally compact and highly maneuverable with a 133 in. turning radius, allowing easy operation even in narrow aisles. *Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Motor control centers

Wherever a number of motors is concentrated in a small area, or where interlocking of controls is required (continuous-process machinery, conveyor systems, etc.), "Concentrol" motor control centers provide a compact, standardized means of grouping motor controls. They eliminate the need for distribution panelboards or individually mounted controls.

Some of the features of "Concentrol" motor control centers are as follows: greater safety because a live circuit is never handled; easier maintenance; valuable space saving; any individual unit can be disconnected from the line while the rest of the control center remains energized; all motors are controlled from one central point; can be furnished with almost any make of control components preferred, to match the control equipment standardized in the plant, thus reducing stock inventories of repair parts and spare "plug-in" units; most changes of motor layout and operation can be accommodated by simple changes of control or wiring; can be furnished with motor starters having selective overload trips, easily set in the field, for either automatic or manual "reset," and every "Concentrol" structure can be moved and relocated in any convenient space.

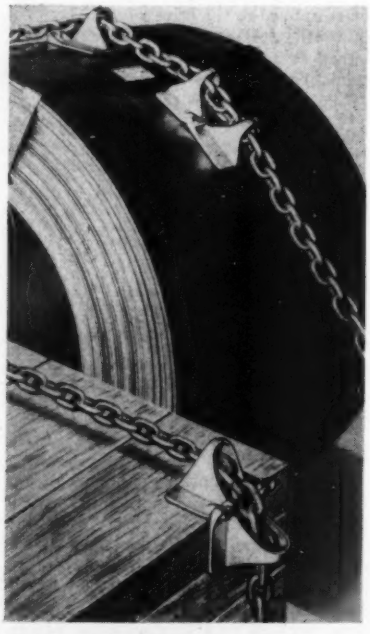
These motor control centers are furnished in three NEMA types and are available with many standard accessories. *Continental Electric Equipment Co., Box 1055, Cincinnati 1, Ohio.*

Positioner

Positioning of cylinder-operated devices is the function of the new Poweractor positioner, recently introduced to the market. Operating from a standard 3-15 psi pneumatic controller signal, it applies a high pressure, pneumatic differential across a cylinder piston, sufficient to produce the position demanded by the controller.

Designed especially for use with the Foxboro Stabiload cylinder, the Poweractor unit will position equipment requiring long stroke and power, such as large size control valves, dampers, variable speed drives, Saunders and pulp stock valves, through pneumatic cylinder (or springless diaphragm) operating mechanisms.

The positioner is a force balance-type instrument, connected to the cylinder piston rod through a bracket and spring assembly. Every change in the controller signal produces a corresponding position change of the piston, and the positioner automatically returns to a null balanced condition. Direction of piston movement with respect to a signal pressure may be reversed by simply inverting the positioner. *Foxboro Co., Foxboro, Mass.*



Load protectors

The new metal "Hinge-Guard" load protectors prevent damage to any type load in transit, such as lumber, paperboard, machinery, tubing, etc., and aid in protective unloading as well. Any chain or cable contact with the load is prevented. These protectors also allow increased chain tension, making loads more compact and less likely to shift.

The two pieces that hinge-lock together to make the unit which will angle from 90 to 180° can be used singly by simply lifting them apart. They accommodate chain or cable up to and including ½ in., and if the grabhook is already secured to the chain, it will thread through the unit. *Canton Manufacturing Co., 2408 Thirteenth St. N.E., Canton, Ohio.*

Articulated platform

A 6,000-lb. capacity electric crane truck equipped with a new type articulated platform is used for faster, easier maintenance of lighting and other overhead equipment. The crane can position the boom and platform for overhead work above machine tools and other obstacles in locations difficult to reach by other means.

In operation, maintenance man and material are picked up by lowering the boom until the platform rests on the floor. Positive mechanical linkage on the boom keeps the platform parallel with the floor at all times, regardless of boom elevation. For maximum coverage from a given aisle location, the boom can be extended to lengths up to 19 ft. and swung in a 270° arc.

This same crane truck and platform can be used for outdoor maintenance. *Yale & Towne Mfg. Co., Philadelphia 15, Pa.*

Rubber pipe lining

New developments in lining and covering pipe, fittings and process equipment with rubber now permit applications which have reduced maintenance costs, protected equipment investments, conserved space and prolonged the useful life of pipe-line and process equipment.

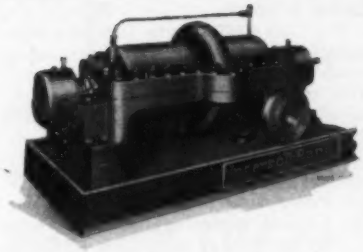
Special designs of bent pipe and shapes can now be lined with rubber without risk of processing failure. It is still recommended practice to place a limit of two 90-deg. bends for each connected length of pipe. However, through recent development of an improved application process it is possible to apply lining on three 90-deg. bends in a single length of pipe as small as 4 in. in diameter.

This new method of lining pipe, valves, etc., results in a smooth interior surface around bends in the pipe or other equipment. The bond between rubber and material has high strength and resistance to aging. According to the manufacturer, the homogeneous construction of the lining used for pipe eliminates failure at the point where the pipe lining extends over the flange face when flanged connections are used. *La Favorite Rubber Mfg. Co., 264 Wagaraw Rd., Paterson, N.J.*

Fork lift trucks

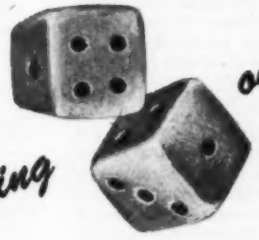
Newest addition to the "FT Series" of fork lift trucks is a 6,000-lb. capacity truck with a 24-in. load center, available in two models.

Model FT60-24 is powered with a 73½ hp, six cylinder gasoline engine and is available as optional equipment with a four cylinder 53½ hp gasoline engine. A six cylinder Diesel engine with a 230 cu. in. displacement is standard for model FTD60-24, with an optional four cylinder, 182 cu. in. displacement Diesel engine. *Buda Co., Harvey, Ill.*



Centrifugal pump

The Ingersoll-Rand line of horizontal, multi-stage centrifugal pumps for medium-pressure applications has been redesigned, incorporating modern hydraulics that give higher efficiency and better operation. These pumps, called the Class CNTA, are intended for boiler-feed, mine dewatering,



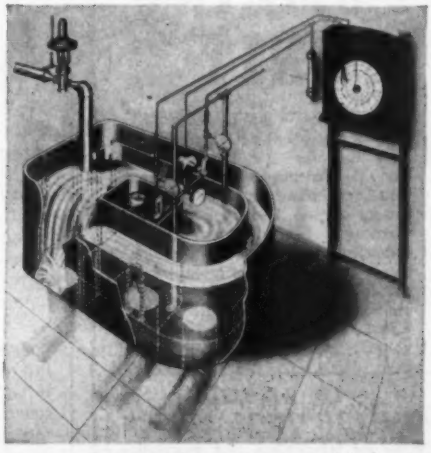
you're not depending on fate

when you use a BRAMMER recording consistency control

Of course, no mill operator consciously leaves his plant operation to Fate. But Fate is tempted where the element of chance in pulp and paper processing is not being constantly minimized.

The ever-rising market standards for quality products at competitive prices demand accurate control of stock consistency in the mill process.

For this reason more and more mills throughout the world are depending on the BRAMMER for proper regulation of pulp stock in varied applications.



The BRAMMER is guaranteed to regulate consistency to ±1/10th of 1 percent. It also controls stock automatically over a wide consistency range and maintains an accurate, daily 24-hour chart on stock consistencies.

Numerous other advantages are described in Bulletin B2 which we will be glad to supply on request.

Manufactured and Sold in Canada by THE ALEXANDER FLECK LIMITED, OTTAWA, CANADA.

PANDIA

PANDIA INC.

122 EAST 42nd STREET • NEW YORK 17, N. Y.

marine, refinery and general industrial services to 800 lb.

The Class CNTA pump features a horizontally-split, smooth-bore cylindrical casing which contains the unit-type rotor assembly. This assembly is composed of the shaft, impellers, and channel rings, which contain the multiple-volute fluid passages. The entire rotor assembly is quickly and easily removed from and installed in the smooth-bore casing, since there are no mating ring fits or delicate alignment problems.

Multiple-volute design, which eliminates radial thrust at all conditions of operation, provides a completely balanced rotor. Back to back grouping of the impellers neutralizes axial thrust developed by the pressure differential across each individual stage. *Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.*

Pumps

Precision, automatic control of the water level at which sump and circulating pumps will turn on is a feature of the Kenco switch and submersible pump. The pump can be set to exactly suit the conditions under which it will operate. The submersible switch has no exposed electrodes or floats to corrode or stick. Furthermore, the submersible circulating or sump pumps operate at any practical depth and are completely submersible and waterproof. They are small and compact and lend themselves to either permanent or temporary installations. *Kenco, Inc., 1125 North Ridge Rd., Lorain, Ohio.*

FOR SALE!

PUMPING UNIT

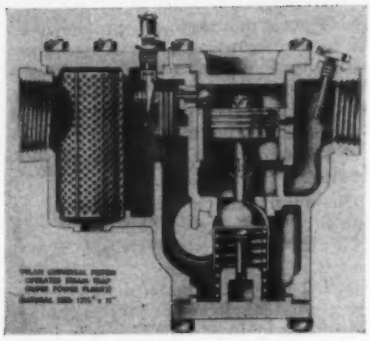
Good used equipment —ready for work!

One (1) Fairbanks-Morse single stage, centrifugal pump, 30-inch bottom section, 24-inch horizontal discharge, 5843 NE, rated approximately 25 m.g.d. at 210-foot head, 720 R.P.M., directly connected to a Fairbanks-Morse Synchronous motor, 1250 H.P., 720 R.P.M., 3 phase, 60-cycle, 13,200-volts.

10 LARGE CENTRIFUGAL PUMPS
Write for information and description

★

MACHINERY & STEEL DIVISION
United Iron & Metal Co.
2545 Wilkens Avenue
Baltimore 23, Md.
Telephone: Gilmor 5600-5601



Steam trap

The new Type SP piston operated steam trap for application where exceptionally large capacities are required combines the Velan 4 operation principle: airvent, strainer, condensate discharge, and check valve.

Comparatively small and three to ten times lighter than other designs of similar piston-operated traps, it has a 2 in. orifice with large capacities. The air-discharge capacity is much larger than that of other designs. *Velan Engineering Co., 1 Exchange Place, Jersey City, N. J.*

New Products Briefs . . .

STORAGE FILES—New space saving, extremely compact steel storage files for old records permit use of waste upper space and valuable floor area. Records go directly from current files onto shelves. Label holders permit instant location and easy access, as there are no cumbersome boxes or drawers to pull out. Shelves adjust vertically on 1½ in. centers to accommodate various size files. Any unit may be removed without moving adjacent units. *Equipto Div., Aurora Equipment Co., Aurora, Ill.*

TAPE—A new transparent, strong pressure-sensitive tape only 2-mils thick, designated as Tape No. 850, is made with a polyester film backing. It is expected to fine use for splicing rolls of paper, plastics, and textiles in manufacturing and treating processes and for various packaging, edging, and reinforcing applications, as well as many other applications. This tape is highly resistant to acids, alkalies, acetones, ketones, hydro-carbons, esters, and other common solvents. *Minnesota Mining & Manufacturing Co., 900 Fauquier St., St. Paul 6, Minn.*

CORROSION RESISTANT COATING—"Ricwilite" phenolic resin coatings are specially formulated to protect equipment against extremely corrosive conditions in all types of industry with a tough, impervious film which is resistant to attack by corrosive acids and alkalies, salt water, rust and wethering. Two types of these coatings are available. No. 1060 is of the baking or heat-hardening type; No. 7100 is of the cold-setting type which is cured or polymerized at room temperatures by the addition of a catalyst just prior to application. *Ric-Wil Plastic Coating & Mfg. Corp., 1290 Euclid Ave., Cleveland 15, Ohio.*

TOGGLE SWITCHES—A series of extremely small toggle switches designed primarily for use in assemblies where precise switching components must be located in unusually small space is a development of Micro's subminiature switch, ISMI. One assembly (6AT2) is a single-pole, double-throw assembly which employs one ISMI switch riveted into a stainless steel toggle bracket. Another (6AT3) includes two basic ISMI switches and gives double-pole double-throw service. *Micro Switch Div., Minneapolis-Honeywell Regulator Co., Freeport, Ill.*

SULFONIC ACID CONDENSATE—Designed to relieve papermaking problems, Accocel 741 is a complex sulfonic acid condensate with high dispersing power. It prevents formation of pitch agglomerates which clog screens, stick to press rolls and driers, and cause sheet spots. It may be used with rosin size to improve sizing efficiency, and as an effective pigment dispersant. *American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y.*

RUBBER HOSE—A new rubber hose recently developed gives promise of resisting concentrated organic and inorganic acids. It is believed that this hose, made of a new compound, will be able to convey 100 per cent concentrations of acetic, hydrochloric and hydrofluoric acids, 75 per cent concentrations of nitric acids, and 98 per cent of sulfuric. This compound will also withstand the action of fuming nitric over 86 per cent if used for intermittent service. The compound is suitable for chlorine and saturated chlorine water service. *Hewitt-Robins Inc., Hewitt Rubber Div., Buffalo, N. Y.*

GASKET MATERIAL—By adding approximately 1/64 in. film or coating of this new plastic gasket material to flange faces and gasket surfaces vacuum line leakage is reduced to a minimum. Any slight leakage which may occur after line has been in service for some time can be corrected without dismantling flanges by applying 1/32 in. of this material around the outside surfaces of the flange where they meet with the gasket. It is formulated in two types. *Flexrock Co., 3652 Filbert St., Philadelphia 4, Pa.*

Nine Publications for Papermakers

Pulp and Paper, Volume I	$15.00
Pulp and Paper, Volume II	15.00
Modern Pulp and Paper Making	9.50
Procedure Handbook of Arc Welding	2.00
Outside U.S.A.	2.50
Drying of Paper on the Machine	1.50
Notes and Observation on Beaters	1.00
Lessons in Papermaking—Part I	1.00
Lessons in Papermaking—Part 2	1.00
Trouble on the Paper Machine	.75
Pulp Bleaching (A Symposium)	.50
Technology of Papermaking Fibres	.50

Mail your order with payment to:

The PAPER INDUSTRY
431 S. Dearborn Street, Chicago 5, Illinois

. . . Fast, accurately measured saturation or coatings with the HUDSON-SHARP AW-2 WET OR DRY WAXER

PROCESSES SHEETS 50 to 95" WIDE WET OR DRY—

FOR THE ARMED SERVICES

We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments. Civilian orders are filled on a reasonable time basis only.

Smaller waxers and wax laminators for every converting need, available.

- Hollow cast iron, cross tied, non-vibrating frame.
- Ball bearings throughout.
- Adjustable ball bearing guide rolls.

Controlled wax heating — steam, oil, or electricity.

Polished, chrome-plated cooling rolls — changeable to heat rolls for dry waxing.

H-S friction clutch — flat or V-belt drive.

Single lever adjustable squeeze rolls.

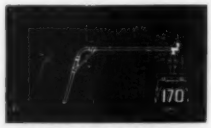
Center shaft friction type rewinder.

Write for complete details.

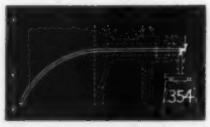
Completely versatile, this modern machine processes fully saturated or dry coated wax papers with equal ease of operation. In wet wax production, sheet is taken from parent roll and immersed in wax bath with movable adjustments to time the dwell of immersion period. Sheet then passes through a squeeze roll section to remove excess wax and through a chilled roll section direct to rewinder. For dry waxing, sheet is carried direct to an applicator roll where a measured quantity of wax is applied to one side of sheet, thence to a heated pressure roll which forces the wax into sheet. Unit features rewinding into a firm, accurate roll. Machine is built in two sections for spacing application unit and chilling-rewind section as desired. Open type construction permits free adjustment means and rapid material roll changes.

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS
Manufacturers of
Printers, Embossers, Folders, Interfolders, Waxers, Laminators, Wrapping Machines, Core Winders, Packaging Presses, Creasers and Napkins, Toilet Tissue and Paper Towel Units

---

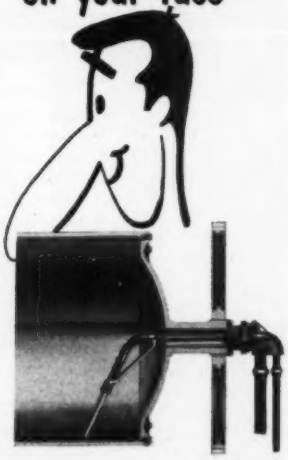


Reaction of ¾" Auto-Flex in '48" dia. dryer. Very low leverage.



Reaction of ¾" ordinary bent pipe. Syphon in 48" dia. dryer. High leverage.

as plain as the nose on your face



The above cuts and captions tell the Midwest Auto-flex Syphon story—and it's as plain as the nose on your face.

End of pipe takes correct position and cannot possibly change its position. That means proper water and air removal. Reduced leverage, compared to other syphon pipes, permits the "pipe" to clear and stay clear of the journal. And that means freedom from wear, hence far longer life.

Thousands of Midwest Auto-Flex Syphons in use and doing fine. A dozen orders from you would prove all claims and makes you an Auto-flex booster. Remember, they're fully guaranteed.

MIDWEST • FULTON MACHINE COMPANY
DAYTON, OHIO

Oriskany WATERBURY FELTS

Quality control is important in paper-making . . . and it's equally important in felt-making, too. That's why you'll find Oriskany Waterbury Felts doing such an outstanding job in many of the finest paper mills in the country. Every Oriskany Felt passes rigid inspections from raw wool processing to finished felt . . . your assurance that you're getting the best that constant research and technical skill can produce.

H. Waterbury and Sons Co.
Oriskany, New York

The Paper Industry New Literature

1952 Technical Books

Following is a reference list of books published in 1952 of special interest to our readers.

The Chemistry of Lignin, by Friedrich Emil Brauns. Published by Academic Press Inc., 125 East 23rd St., New York 10, N. Y.

Forest Inventory, by Stephen H. Spurr. Published by The Ronald Press Co., 15 East 26th St., New York 10, N. Y.

Forest Management, by H. Arthur Meyer. Published by The Ronald Press Co., 15 East 26th St., New York 10, N. Y.

Ink and Paper in the Printing Process, by Andries Voet. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.

Paper and Papermaking, by F. H. Norris. Published by Oxford University Press, Inc., 14 Fifth Ave., New York 11, N. Y.

Paper Chromatography, by Richard J. Block, Raymond LeStrange, and Gunter Zweig. Published by Academic Press Inc., 125 East 23rd St., New York 10, N. Y.

Pathology in Forest Practice, by Dow Vawter Baxter. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Pulp and Paper—Chemistry and Chemical Technology, by James P. Casey. Volume I: Pulping and Papermaking; Volume II: Properties of Paper and Converting. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.

Technology of Coated and Processed Papers, by R. H. Mosher. Published by Chemical Publishing Co., Inc., 212 Fifth Ave., New York 10, N. Y.

Wood Chemistry, by Louis E. Wise and Edwin C. Jahn. Two volumes (new second edition). Published by Reinhold Publishing Corp., 330 West 42nd St., New York 18, N. Y.

Books

INSECT ENEMIES OF WESTERN FORESTS. Revised Edition. (Miscellaneous Publication No. 273.) By F. P. Keen. Published by United States Department of Agriculture, Washington 25, D. C. 280 pages. $1.00. Paperbound. (Order from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

First issued in February, 1938, this field manual, which is restricted to insects found in forests west of the Great Plains, was extensively revised in July, 1952, to take into account the new insecticides developed during World War II and the great change such chemicals as DDT have made on forest-insect-control procedures.

The author, who is an entomologist in the Division of Forest Insect Investigations, Bureau of Entomology and Plant Quarantine, of the Agricultural Research Administration, has prepared this manual to meet the needs of forest rangers, field men, and others entrusted with the protection of forest resources, the prevention of insect damage to timber crops, and the control of forest-insect outbreaks.

Some of the topics covered in this manual are: kinds of forest insects and the losses they cause; relation of insects to forest management; determining causes of forest-tree damage; insects affecting seed production; insects injurious to forest nurseries, young trees, mature forest trees, wood and other forest products, and forest range plants; natural control; silvicultural, biological, and artificial or remedial control of injurious forest insects. An index of host trees is included.

WOOD PULP STATISTICS, 1952 Edition. Published by United States Pulp Producers Association, Inc., 122 East 42nd St., New York 17, N. Y. 227 pages. $10.00.

A long range record of the trend and pattern of wood pulp supply and demand in the major producing and consuming countries of the world is presented in this annual publication, which is divided into three sections: United States; foreign countries; and world summaries.

Contained in this book is information, compiled from widely scattered sources, which is basic to an understanding of wood pulp and paper markets.

LOCKWOOD'S DIRECTORY OF THE PAPER AND ALLIED TRADES, 1953 Edition. Published by Lockwood Trade Journal Co., Inc., 15 West 47th St., New York 36, N. Y. Regular Edition, 1548 pages. Traveler's Edition, 5 x 8¾, 358 pages. $10.00.

Included in this 78th annual edition of the directory are comprehensive reports of the paper and pulp mills in the United States and Canada; an alphabetical list of the names of officers and operating executives of the mills, including their connections; reports of the paper and pulp mills in Latin America and Philippine Islands; a list of idle mills and new mills in the United States and Canada; a classified section showing in alphabetical order the products made by all of the paper and pulp mills in the United States and Canada, and a section showing the names and street addresses of pulp and paper mills and mill agents maintaining offices in the principal cities of the United States and Canada.

A classified section of paper, pulp mill and converters equipment and supplies; reports of converters; converters' products; general paper merchants; paper exporters and importers in New York City; rags and paper stock dealers; kind and grade of rags and paper stock consumed by mills; pulp testers; trade associations; wood pulp agents; a statistical table showing the number of concerns owning mills, together with the number of paper and pulp mills in the United States and Canada; and an alphabetical list of watermarks and brands used in the American paper trade, with names and addresses of owners, is also found in this volume.

SOURCE OF SUPPLY DIRECTORY—1952 Edition. Published by Howard Publishing Co., 111 W. Washington St., Chicago 2, Ill. 884 pages. Paperbound. 4½ x 6½. $4.00.

This annual publication is a directory of paper and allied lines for paper merchants and converters. Contained in this directory are sections on sources of supply; converting machinery, equipment and supplies; roster of paper merchants; manufacturers' representatives, and exporters and importers. The first two sections are classified according to product, while the other three sections are grouped according to city and state. An advertising index is included.

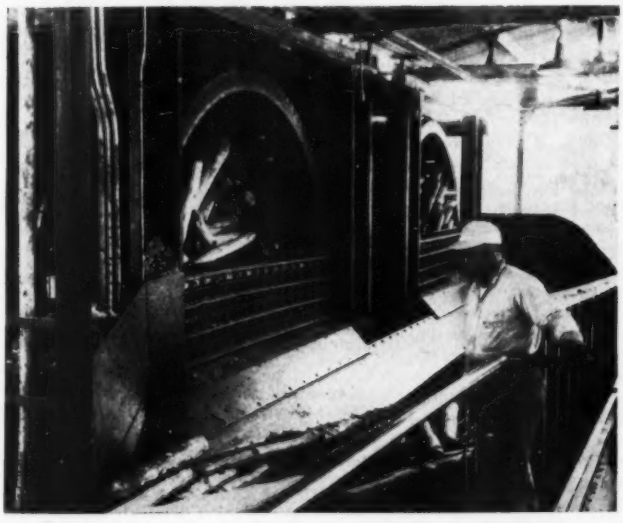
CHEMISTRY OF LITHOGRAPHY. By Dr. Paul Hartsuch. Published by Lithographic Technical Foundation, Inc., 131 East 39th St., New York 16, N. Y. 256 pages. $12.00 to non-members; $6.00 to members less discount.

The book begins with a section on "Chemistry for the Beginner," which is presented with assumption that the reader knows nothing about chemistry. After this fundamental instruction, it goes on to cover the many categories in which chemistry is involved in lithography: a definition of pH and how to measure it; the role of water in lithography; chemical calculations; chemistry of the compounds of carbon; albumin, deep-etch, and special methods of platemaking; chemistry of photography, paper, ink; and chemistry in the pressroom.

MODERN PAPER-MAKING, Third Edition. By Robert Henderson Clapperton. Published by Basil Blackwell, 49 Broad St., Oxford, England. 526 pages. 45 shillings (about $6.35 U. S. coin).

The third edition of this book, containing 27 chapters, has been completely revised to bring it into line with modern practice. The book begins with a brief history of paper-making and then goes on to discuss six principal fibrous materials used in the manufacture of paper: cotton, flax (or linen), hemp, esparto, wood and straw. The next five chapters deal with the treatment of these fibers. Stock preparation, beating and refining are thoroughly covered. The

Bark Hard or Soft Woods up to 8′ in Length Wet . . . Dry . . . or Combined Dry and Wet With F.M.P. Welded M-Bar Barking Drums



M-Bar—Hot Rolled

Exclusively used in F.M.P. drums. Welded and riveted to heavy ship channels.

119—barking drum sales since 1947—(99—12′ D. x 45′ L.; 11-12′ D. x 67½′ L.; 9 misc.)

Barking drums can be furnished with long or short column steel frames to fit customer's requirements. Drumshells shipped completely shop-assembled.

Built-up drumshells and steel frames fabricated at Birmingham, Chicago, and Greenville, Pa.

FIBRE MAKING PROCESSES, INC.

Manufacturers of Barking Drums since 1915, welded drumshells since 1933

Tribune Tower, Chicago 11 **Russ Bldg., San Francisco 4**

Kalamazoo GLAZED TILE TANKS AND CHESTS...

Engineered to your needs . . . any size or shape . . . impervious to corrosion . . . keep contents clean . . . reduce friction of flowing liquids . . . easiest to clean . . . last for years and years.
SEND FOR COMPLETE DETAILS

Kalamazoo TANK and SILO CO.

TILE TANK DIVISION

227 HARRISON STREET . . . KALAMAZOO, MICHIGAN

SPRAY NOZZLES
BINKS
for chemical spraying, cooling, humidifying, dehydrating, and hundreds of other applications
You'll get the *right* nozzles quicker by calling Binks...manufacturers of one of the most complete selections ever produced. A wide range of spray patterns, sizes, capacities... with nozzles cast or machined from standard or special corrosion-resistant metals.
Binks Manufacturing Company
3118-32 Carroll Ave., Chicago 12, Ill.
O. K. BINKS. Send me your Spray Nozzle Catalog...FREE!
NAME
ORGANIZATION
ADDRESS
CITY ZONE STATE
Binks
A COMPLETE LINE OF INDUSTRIAL SPRAY NOZZLES AND COOLING TOWERS

beating of cotton, flax, wood pulp and esparto and the characteristics they impart to paper is discussed.

Repulping "broke," the effect of adding broke to the furnish, broke and waste, and the treatment of wet-strength broke are topics discussed in Chapter XI, while the following chapter takes up rosin sizing, starch, silicate of soda, alum, and loadings. Natural dyestuffs, synthetic pigment dyestuffs, and synthetic soluble dyestuff, furnish, and color troubles in paper dyeing are dealt with in the chapter on the dyeing of paper. Cleaning of paper stock at the machine is the subject of Chapter XIV. Three chapters are devoted to the fourdrinier machine, one to the M. G. or Yankee machine, and one to the board or vat machine. Paper-making on the machine and water-marking are described in Chapter XVIII.

The last seven chapters of the book cover the following subjects: the manufacture of newsprint; handmade paper; gelatine sizing, hand sizing, tub sizing, and air drying; damping, supercalender, plate glazing, conditioning, cutting, guillotine, slitting and winding, sorting and finishing; the testing of paper, transparency and opacity, durability and storage of paper; water treatment—recovery and re-use of water; and soda recovery.

The concluding part of the book contains an appendix of tables and a section on British paper trade customs.

Booklets and Pamphlets

RECENT ADVANCES IN PULPING STRAW IN THE UNITED STATES (Bulletin AIC-324). By S. I. Aronovsky. Published by Northern Regional Research Laboratory, U. S. Department of Agriculture, Agricultural Research Administration, Bureau of Agricultural and Industrial Chemistry, Peoria 5, Ill. 8 x 10½. 12 pages. Sections in this pamphlet include information on early history, situation in 1940, corrugating strawboard, mechano-chemical process, commercial trials, fine paper pulp, neutral sulphite process, fine mechano-chemical straw pulp, and straw pulp-wood pulp blends.

LIST OF PUBLICATIONS JULY 1 TO DECEMBER 31, 1951. Published by U. S. Forest Products Laboratory, Madison 5, Wis. 5½ x 8. 8 pages. Publications in this pamphlet are listed under the following headings: Chemistry of Wood and Derived Products; Glues, Glued Stock, Plywood and Veneer; Packaging Mechanical Properties; Paints and Finishes; Pulp and Paper; Sandwich; Seasoning; Wood Preservation; Wood Structure; Wood Utilization, Logging, and Milling; and Miscellaneous.

HIGH CORROSION RESISTANCE GIVES NICKEL PLATED METALS WIDE RANGE OF USES. By W. H. Prine. Published by International Nickel Co., Inc., Dept. EZ, 67 Wall St., New York 5, N. Y. 8½ x 11. 4 pages. This article reprint deals with equipment used in various industries, including the pulp and paper industry. Many photographs are included.

EDUCATION FOR YOUR CAREER IN THE PULP AND PAPER INDUSTRY. Published jointly by University of Maine Pulp and Paper Foundation and University of Maine. 16 pages. This booklet is designed to acquaint secondary school students with opportunities that are open in the pulp and paper and allied industries and programs of study that are available at the University of Maine to prepare them for careers in this field.

MEASUREMENT OF THE THICKNESS OF CAPACITOR PAPER (Circular No. 532). By Wilmer Souder and S. B. Newman. Published by National Bureau of Standards. 10 pages. 8 x 10¼. 15 cents. (Order from Government Printing Office, Washington 25, D.C.) This circular describes and analyzes measurements made at NBS on some commercial thin capacitor papers by means of the interferometer, micrometer microscope, mechanical micrometers, and surface analyzer. A discussion of the three methods and the instruments used covers not only the application of these methods but also their difficulties and limitations. The circular contains a statistical analysis of the results obtained in a number of laboratory measurements made at NBS and gives suggestions to guide other laboratory workers in dealing with the problem.

FORESTS EVERLASTING (Film). Produced for Union Pacific Railroad, 1416 Dodge St., Omaha 2, Neb. One-half hour. Set in the beautiful forests of the Pacific Northwest and western mountain states of Union Pacific territory, this color and sound motion picture, covering forest conservation and lumbering operations, unfolds the story of lumber from the growing of fir and pine forests to its use in homes and industry. Production is stressed through proper growth of trees, tree farming and seeding.

AMERICAN SILVICULTURE AND TROPICAL FOREST PROBLEMS (Technical Assistance Mission No. 18a). Published by the Organization for European Economic Co-operation, Paris, France. Distributed by Columbia University Press, 2960 Broadway, New York 27, N.Y. 96 pages. 6 x 9½. $1.25. This report by the forestry team of O.E.E.C.'s mission of experts to certain subtropical forest areas of the United States covers the following topics: improvements of pastures in relation to erosion control; reafforestation with conifers; ecology and silviculture of pines in North Florida; control of erosion; and water consumption of vegetation and general watershed hydrological research.

PULP, Report of the Subcommittee on Study of Monopoly Power of the Committee on the Judiciary. (Part 2). Published by United States Government Printing Office, Washington, D. C. 6 x 9. 54 pages. The results of a recent study of the pulp industry are presented in this booklet, which is divided into two main parts: Economic background, and Factors affecting competition in the pulp industry. The first section discusses the importance of the industry, production and capacity, consumption, structure of the industry and pulp prices. The second section deals with the Scandinavian pulp cartel, activities of Canadian producers, the domestic pulp market and international cooperation among pulp producers.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified; by writing direct to the manufacturers. Please address requests on your company letterhead.*

Stainless Steel Equipment. Stainless Products Inc., 399 Wayne St., Jersey City 2, N. J.—This new 8-page bulletin contains photographs of various types of alloy equipment designed and produced by Stainless Products. The last page of the booklet lists some of the products which have been produced and some representative customers.

Control Valve Design. Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.—"New Techniques in Control Valve Design" is the title of this new 16-page technical bulletin (No. 106). It covers in concise and easily understandable language a complete review of the development of our present day conventional control valves and a preview of future designs. Written by R. B. Werey, president of Conoflow Corp., the bulletin is well-illustrated and fully explains the underlying reasons for today's designs and the logic behind the predicted designs for the future.

Agitators. E. D. Jones & Sons Co., Pittsfield, Mass.—This 6-page brochure, EDJ-1037, gives design and technical data on the Jones cartridge-type propeller agitators. Illustrated by photographs and a complete schematic drawing, the brochure provides detailed information and a drawing giving dimensions for nine different sizes of agitators. Also included are working drawings of tested chest designs and a comprehensive table of weights, volumes, etc., of liquid pulp stock carrying various percentages of air dry stock.

Chemical Proportioning Pumps. Proportioneers, Inc., Providence 1, R.I.—8-page Bulletin No. 1225 contains the latest information on the heavy-duty Chem-O-Feeder, an all-purpose chemical proportioning pump. Specifications and features together with many installation diagrams, a list of chemicals fed, and other helpful information are given.

Spectrophotometer. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Station 40, Wayne & Windrim Aves., Philadelphia 44, Pa.—Instrumentation Data Sheet 10.16-13, containing 4 pages, describes the application, operation, and salient features of the new direct transmittancy spectrophotometer produced by the National Technical Laboratories. Illustrations of the equipment, typical chart records and operation of the optical system are included.

Boiler Water Conditioning. E. F. Drew & Co., Inc., 15 East 26th St., Palmo, N.Y.—This new 12-page catalogue outlines difficulties caused through industrial water contamination, recommended water conditioning treatments for scale, sludge, corrosion, carryover and other boiler conditions, and efficient control methods. Details on the Drew system of complete boiler water conditioning are fully explained.

Products and Services. American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N.Y.—The third edition of "Products and Services of American Cyanamid Company for Industry and Agriculture" contains a convenient listing and description of the products and services that American Cyanamid is now offering to industry and agriculture. The book also outlines the divisional structure through which such products are sold.

Viscometers. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Md.—This 4-page bulletin describes bubble viscometers and tube holders, giving specifications, prices, photographs, etc. Suggestions for special and routine tests are presented, in addition to viscosity considerations.

Water Softening. Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32, Pa.—Publi-

MAGNUS-MADE

FABRICATED SCREEN PLATES

for High Plate Capacity – Long Plate Life

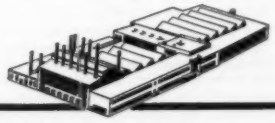
"Hardy" fabricated screen plates, made by Magnus of chrome-nickel-steel or inconel, have a high-strength, thin sheet design that's specially engineered for *maximum flow*. About 40,000 of these plates are now in service, with performance records that prove these three important advantages:

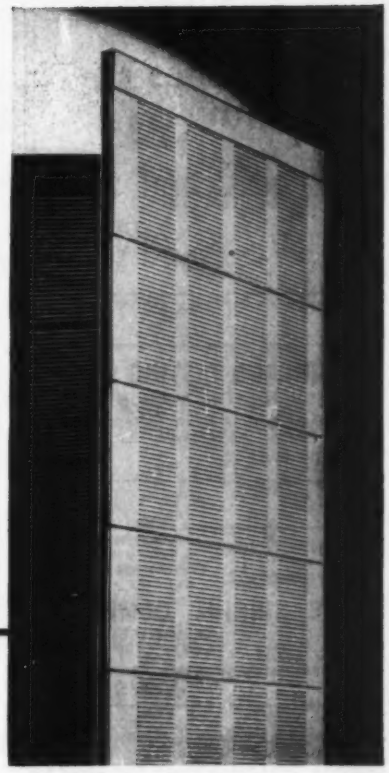
1. Increased Plate Capacity. The thin sheet eliminates relief milling, and with recommended arrangement, substantially increases capacity per plate.

2. Longer Life. Slots remain sharp, side walls highly polished for the life of the plate. There's greatly improved corrosion resistance, too.

3. High, Sustained Yield. Fabricated screen plates assure consistent, uniform quantities of cleaner pulp. This means improved production at reduced operating costs.

Complete information is yours on request. Or if you like, we'll gladly have an engineer call.





MAGNUS METAL CORPORATION, *Fitchburg, Massachusetts*

Metalworkers for the Paper Trade

SCREEN PLATES: BRONZE, CHROME-NICKEL-STEEL, AND INCONEL
VALVES: GATE, SWING CHECK, BLOW, GLOBE, ANGLE AND "Y"

SULPHITE MILL ACID PLANTS

Sulphur Burning Plants • Jenssen Two Tower Acid Systems • Gas Coolers—Surface and Spray Type • Jenssen Pressure Acid Systems • Jenssen Auxiliary Process Towers • Recovery Plants—Cooking Acid

SOLUBLE BASE ACID PLANTS
SEMI CHEMICAL PLANTS
JENSSEN SO_2 ABSORPTION SYSTEMS

FOR BLEACH PLANT APPLICATION
SULPHUROUS ACID PREPARATION

G. D. JENSSEN CO., INC.
WATERTOWN, NEW YORK
WESTERN REPRESENTATIVE:
JAMES BRINKLEY COMPANY, Seattle, Washington
FOUNDED 1915

The Trade-Mark of

Dependable Felts

The Waterbury Felt Company

SKANEATELES FALLS, N. Y.

ENGLISH ECCO CLAYS CLAYS

ECCO CLAYS TRADE MARK

UNIFORM • SUPERIOR • DEPENDABLE

English China Clays Sales Corporation
551 Fifth Avenue, New York City

The Paper Industry
Professional and Business Services

CHICAGO TESTING LAB.
SPECIALTIES DIVISION
536 Lake Shore Drive, Chicago, Ill.
Complete Paper Testing Facilities
A. C. Dreshfield G. Abson

Engineers
Industrial Plants • Textile & Paper Mills • Location Studies • Appraisals • Reports • Surveys
J. E. SIRRINE COMPANY
GREENVILLE
SOUTH CAROLINA

cation 4520-A, "Cochrane Zeolite Softeners," gives a detailed explanation of zeolite water softening, including a glossary of terms used in the process, data for laying out a zeolite softening plant, the factors governing the size of equipment, the selection of zeolite materials and a detailed description of the four stages of operation of a sodium zeolite softener. A complete description of the hydromatic single control valve is included.

Washers. Detrex Corp., Box 501, Detroit 32, Mich.—This 8-page booklet, which describes the Detrex complete line of industrial washers, is illustrated with actual photographs of equipment. The operational advantages of "one-source efficiency" are described. Also included are some general washer operating hints.

Paint. U. S. Stoneware Co., Akron 9, Ohio—16-page Bulletin No. 730 gives a full description of Tygon paint and also incorporates information on Tygorust, the new "no-prep" vinyl primer. The bulletin tells where and where not, how and how not to use this paint and primer. Comprehensive chemical-resistance charts and an extensive chart on recommended primers and surface treatments are included.

Water Softeners. Permutit Co., 330 West 42nd St., New York 36, N.Y.—Troubles caused by the utilization of hard water and the economies effected by curing them are thoroughly discussed in the 16-page bulletin, No. 2386. Several industries in which steam and water are of importance are listed. The bulletin explains the three basic types of ion-exchange equipment and shows how these units can be profitably utilized.

Motor Controls. Arrow-Hart & Hegeman Electric Co., Industrial Control Div., 103 Hawthorn St., Hartford 6, Conn.—This 4-page illustrated folder tells the story of the design progress behind the development of the Type "RA" magnetic motor control line.

Industrial Truck. Lewis-Shepard Products, Inc., Dept. R-1, Watertown, Mass.—The Model "M", both high and low lift, recent addition to the SpaceMaster line of industrial trucks, is described in a new 4-page circular. It describes the advanced operational features of this model. Specifications and a dimensional drawing are also included. The various truck types are illustrated.

Industrial Trucks. Lewis-Shepard Products Inc., Watertown 72, Mass.—This new 18-page catalogue (No. 34) describes the Jacklift electric truck and the Jackstacker truck, two units of the Master line of industrial trucks. The latest engineering and operating features of the various models are given.

Steam Generators. Erie City Iron Works, Erie, Pa.—This 20-page catalogue describes the field erected and factory assembled VL 2-drum water tube steam generator. Design features and circulation are thoroughly discussed. Two diagrams show direction of gas travel in this steam generator, and many other diagrams, photographs, cutaway drawings, and tables are included. Information is given on factory assembled VL's for underfeed stoker, spreader stoker, oil or gas, and field erected VL's for spreader stoker and all firing methods. A list of Erie City products and a representative list of the users of these steam generators are presented.

Motor Drives. Worthington Corp., Harrison, N. J.—Allspeed motor drives of from ½ to 7½ h.p. are described in a 16-page bulletin, No. AS-1600-B6. Both upright and horizontal drives of either closed or skeleton types are pictured and described. Sixteen pictures graphically portray the ease of belt change. Such problems as service, electric motors, torque, bases, adverse operating conditions, shaft variations and mounting are discussed. Two pages of selection tables, one page describing how to select the proper drive, and one page each on operation and maintenance are included. Dimensions and line drawings on the various drives are also featured.

Bridgeplates. Magnesium Company of America, East Chicago, Ind.—Lightweight heavy-duty magnesium Dockboards are described in this 4-page folder, which contains 10 photographs illustrating magnesium bridgeplates in action on users' docks, loading and unloading trucks and railroad cars.

Vacuum Differential Drainage. Stickle Steam Specialties Co., Indianapolis 18, Ind.—The new 4-page bulletin, No. 260, presents descriptive details and a step-by-step operating picture of the improved vacuum differential drainage system for paper mills, which incorporates an all-new vacuum pump. A step-by-step operating picture of the new vacuum pump is also given. A description and photograph of the automatic differential valve, both the basic unit and the duplex unit of the vacuum pump, the micro adjustable orifice and micro adjustable orifice with indicating thermometer is included.

Metal Hose. Flexonics Corp., 1414 S. Third Ave., Maywood, Ill.—32-page Catalogue CMH-130 covers the full range of Rex-Weld corrugated flexible metal hose, Rex-Tube convoluted hose types, and Rex-Flex stainless steel flexible metal hose. Complete specifications are given. Also covered are coupling types, special assemblies, and installation information.

Disc Filters. Denver Equipment Co., 1400-17th St., Denver 17, Colo.—2-page Bulletin No. F9-B3 tells how Denver disc filters eliminate filtrate blowback to produce drier filter cake. Dimensions and capacities of these disc filters are given.

Diatomite. Johns-Manville, 22 E. 40th St., New York 16, N.Y.—This 16 mm, 36-minute, sound film in full color covers diatomaceous silica products called Celite. Entitled "Celite, The Story of How Johns-Manville Puts the Diatom to Work," explains how the Celite diatomite deposit was created over five million years ago, how it is mined and converted into usable forms, and how its properties are put to work. Various industrial plants where Celite is used as a filter aid are shown. The film shows some of the ways in which Celite mineral fillers improve products and processes and points out other applications. A folder about the picture and still photographs showing some of the Celite mining and processing operations are also available.

Carton Sealing Tapes. Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.—How seven "Scotch" brand pressure-sensitive tapes can be used for various carton sealing and reinforcing tasks is shown in a new 6-page booklet. The booklet, which describes tapes Nos. 250, 280, 320, 710, 720, 880, and 890, contains 25 photographs of many different applications. Use of the tapes on manual, semi-automatic, and fully automatic dispensing and sealing equipment is shown. A table listing the tapes' properties describes the thickness, elongation, tensile strength, and adhesion of each.

Remote Pressure Recorder. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—2-page Instrumentation Data Sheet 10.2-5 describes a remote pressure recorder comprising the Frederick Flader Teledyne unit, plus the Brown ElectroniK recorder. Applicability, equipment requirements, and operating principles are discussed. Photographs of the equipment, specifications for the Teledyne pressure transmitters, and dimensional drawing of the two basic types of pressure transmitters are included.

Resin Emulsions. American Resinous Chemicals Corp., Peabody, Mass.—Data Sheet A-43 covers heat seal emulsions designed primarily for heat bonding various combinations of papers, cloths, leathers, metal foils, plastic films, and other surfaces.

Pigments. General Dyestuff Corp., 435 Hudson St., New York 14, N.Y.—A new 16-page brochure describes the properties and uses of Heliogen colors, presenting full information on the powder brands, paste and presscake brands, water-dispersible powder brands and water-dispersible paste brands.

White Water Temperature Control. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—2-page Instrumentation Data Sheet 2.9-11A describes various methods of automatically controlling white water temperature to obtain maximum drainage on the wire. Included are an installation photograph, application drawing, and illustrations of different control instruments.

Flotation Machine. Denver Equipment Co., Box 5268, Denver 17, Colo.—4-page Bulletin No. F10-B63 describes the Denver "Sub-A" flotation machine and flotation process in the paper industry. Based on existing commercial installations, the application of "Sub-A" Flotation and a typical flowsheet for paper reclamation are given. Bulletin No. F10-B64, containing 4 pages, is an article reprint entitled "Flotation Opens New Horizons in the Paper Industry," by J. W. Jelks of the Paper Pulp Division of Denver Equipment Co.

Worm-Gear Motor. U. S. Electrical Motors Inc., Box 2058, Los Angeles 54, Calif.—The new low speed right-angle worm-gear motor introduced as Type GW Syncrogear is fully described in a new 8-page bulletin. Many drawings and photographs are included. The various types of this motor are pictured and described.

Grabs. Mansaver Industries. New Haven, Conn.—This 16-page bulletin, No. G-3, contains many photographs illustrating the application of numerous types of grabs used in various industries. One section is devoted exclusively to the paper industry.

Engineering Economics. Battelle Memorial Institute, 505 King Ave., Columbus, Ohio—This 16-page booklet describes how Battelle's engineering economics research aids in management planning. It goes on to describe the six broad fields which this research covers. Case histories of research at Battelle are presented.

Fabricating Plant. E. D. Jones & Sons Co., Pittsfield, Mass.—A new 4-page brochure features the facilities and equipment of E. D. Jones & Sons Co. fabricating plant. The brochure contains many photographs of plant and equipment and provides complete data on plant facilities and details of equipment, which includes shears, punches, press brakes, and the latest in electric welding, flame cutting and grit blasting machinery.

WELDCO Monel-Covered Rolls

STILL ON THE JOB
After 14 Years!

Thirteen Weldco rolls were installed 14 years ago in a South Carolina Kraft mill . . . . and they're still on the job! The answer lies in the tough outer shell of smooth, polished Monel. For Monel offers greater resistance to corrosion and abrasion . . . reduces friction . . . increases felt life . . . lessens wear on fourdrinier wires. For your new machine, be sure to specify Weldco rolls. And when you have your old rolls reconditioned, make sure they're covered with Monel!

THE YOUNGSTOWN WELDING & ENGINEERING COMPANY
3721 OAKWOOD AVENUE · · YOUNGSTOWN 9, OHIO

CARTHAGE MACHINE CO.

• • •

Machinery for Ground Wood and Chemical Pulp Mills.
CARTHAGE, NEW YORK

MEN WANTED—POSITIONS OPEN

We can place supts. and asst. supts. for tissue, newsprint, and board mills; office manager; chemists, chem. engineers, and laboratory men for mills, also for demonstrating chemicals, sizings, adhesives, etc.; pulp-paper technologist $600-$700 month.

Plant engineers, asst. plant engineers, master mechanics, designers and draftsmen; fourdrinier mach. tender; back tenders; power plant supervisor; trainee pulp-paper salesman.

List your application with us. It will be confidential.
CHARLES P. RAYMOND SERVICE, Inc.
Phone: LIberty 2-6547 — 294 Washington St. — Boston 8, Mass.

FREE FACTS ON PAPER MARKET

New Factbook outlines advantages awaiting manufacturers, processors and fabricators in Metropolitan Oakland Area (MOA). This vast and fast-growing industrial center provides rich local opportunities for all paper producers selling to industry or consumer. Also affords dead-center proximity to entire multi-billion dollar West market. In MOA, you will profit from: important savings in shipping time and cost; nearby terminals for major rail, truck, air, sea carriers; ideal climate; all-season production; all-season demand; skilled labor sources; acres of level plant sites; phenomenal, continuing G-R-O-W-T-H. Write for free Factbook today. Address: Alameda County New Industries Committee, Suite M, 427—13th Street, Oakland, California.

PHOTOVOLT
Photoelectric REFLECTION METER

for accurate measurement of

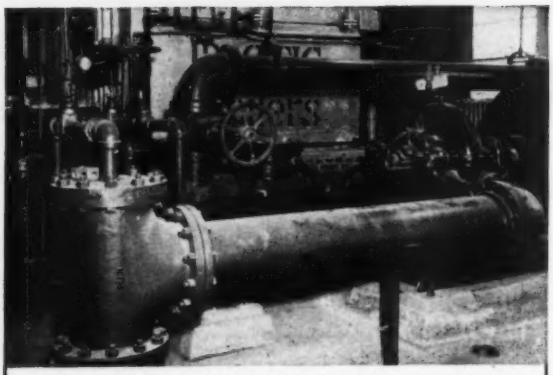
Brightness and Opacity

of pulp and paper in terms of TAPPI specifications. Also for

Gloss and Color

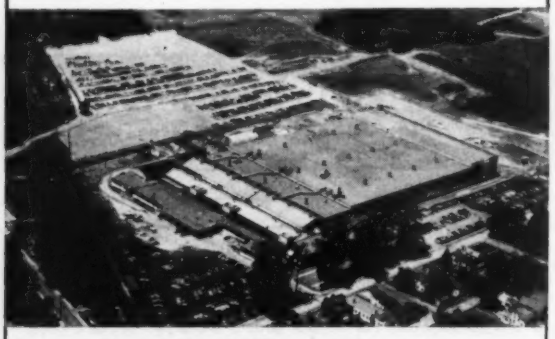
tests on paper, cardboard and other paper products.
Portable, reliable, rugged, simple to operate

PHOTOVOLT CORP.
95 MADISON AVE. NEW YORK 16, N. Y.
Also: Colorimeters, pH Meters



"K" Fittings in largest helicopter plant

Conspicuous in the above photo are some of our big flanged tees and elbows. You will also see several of our companion flanges and screwed elbows. This is one of the numerous installations of "K" Fittings in the world's largest helicopter plant, that of Piasecki Helicopter Corporation, Morton, Pa.



Plant of Piasecki Helicopter Corporation

Piasecki H-21 Work Horse currently on the production line.

Good workmanship sells "K" Fittings

K PIPE FITTINGS

CAST IRON AND MALLEABLE

3,000 Shapes and Sizes

Complete information gladly furnished.

THE KUHNS BROTHERS COMPANY

Dayton 1, Ohio

Established 1887

Combined marketing facilities with Malleable Iron Fittings Company, Branford, Conn.

MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

The following are OPS ceiling prices, cents per pound, delivered mills:

	per cwt.
Blue Overalls	14.50
Corduroy	8.00
Washables, No. 1	6.50
Percales	12.50
Light Prints, No. 1	11.50
Khaki Cuttings—	
Sun Tan	11.50
Mixed	8.00
New White Canvas	19.00
Canton Flannels, bleached	21.00
Canton Flannels, unbleached	21.00
Shirt Cuttings—	
New White No. 1	21.00
Silesias No. 1	16.00
New Unbleached	21.00
Fancy	10.00
Linen Cuttings—	
American	14.50
White	21.00
Grey	21.00

Current quotations to mills, f.o.b. New York:

Blue Overalls	8.50	to	9.00
Washables, No. 1	4.00	to	4.25
Light prints, No. 1	8.00	to	8.50
Khaki Cuttings, Mixed	4.25	to	4.50
Canton Flannels, Bleached	14.00	to	14.50
Canton Flannels, Unbleached	14.00	to	14.50
White Shirt Cuttings, No. 1	14.50	to	15.00
Silesias, No. 1	11.50	to	12.00
New Unbleached Muslins	16.00	to	16.50
Fancy Shirt Cuttings	7.25	to	7.75
American Linen Cuttings	12.00	to	12.50

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.		
Roofing—			
No. 1	1.25	to	1.35
No. 2	.95	to	1.05
No. 3 and 4	.80	to	.90
Twos and Blues—			
Repacked	2.50	to	2.75
Thirds and Blues—			
Repacked	2.25	to	2.50
Miscellaneous	1.75	to	2.00
Whites, No. 1—			
Repacked	5.75	to	6.25
Miscellaneous	5.00	to	5.25
White, No. 2—			
Repacked	4.75	to	5.00
Miscellaneous	4.00	to	4.25

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.		
Gunny No. 1—			
Foreign	5.25	to	5.50
Domestic	5.00	to	5.25
Wool Tares—			
Light	5.75	to	6.00
Heavy	6.00	to	6.25
No. 1 Scrap Bagging	4.50	to	4.75
Manila Rope—			
No. 1 large	6.75	to	7.00
No. 1 small	5.75	to	6.00
Sisal Rope—			
No. 1 large	6.00	to	6.25
No. 1 small	5.50	to	5.75
New Burlap Cuttings	6.50	to	7.00
Jute Threads—			
Foreign (Nom.)	6.75	to	7.25
Domestic	6.75	to	7.25
Strings—			
No. 1 sisal	5.50	to	5.75
No. 2 sisal	5.00	to	5.25
Soft jute	5.25	to	5.50
Mixed	3.25	to	3.50

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton		
Shavings—			
Hard White Env. Cuts	115.00	to	120.00
Hard White No. 1	80.00	to	85.00
Soft White, one-cut	75.00	to	80.00
Soft White, No. 1	65.00	to	70.00
Coated Soft	40.00	to	45.00
Fly Leaf No. 1	25.00	to	30.00
Fly Leaf, Woody No. 1	25.00	to	30.00
No. 2 Mixed Col. Woody	20.00	to	25.00
Flat Stock—			
No. 1 Heavy Books and Magazines, Repacked	20.00	to	22.00
Mixed Books	14.00	to	15.00
Ledger Stock—			
No. 1 White	55.00	to	60.00
No. 1 Mixed (Colored)	35.00	to	40.00
Manilas—			
New Env. Cuttings	60.00	to	65.00
New Env. Cuts, One-Cut			
Extra Manilas	22.50	to	25.00
Manila Tab Cards, Free of Ground Wood	65.00	to	70.00
Colored Tab Cards	45.00	to	50.00
Kraft—			
New Envelope Cuttings	60.00	to	65.00
Tripled Sorted No. 1 100%	45.00	to	50.00
No. 1 Old Assorted	30.00	to	35.00
News—			
White Blank	65.00	to	70.00
Overissue	24.00—		
No. 1 Folded	18.00—		
Old Corrugated Containers	20.00—		
New Jute Corrugated Cuts	26.00—		
Mill Wrappers	14.00—		
Box Board Chips	11.00—		
No. 1 Mixed Paper	10.00—		

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—			
Lump, cwt.	4.55—		
Ground, cwt.	4.30—		
Powdered, cwt.	4.70—		
Blanc Fixe—			
Pulp, bulk, ton	90.00—		
Dry, barrels	95.00—		
Bleaching Powder—			
Drums, cwt.	5.00	to	6.00
Casein (Domestic Standard)			
20-30 mesh (bags), lb.			
80-100 mesh (bags), lb.	28.00—		
Argentine, lb.	17.50	to	18.00
China Clay—			
Domestic Filler Bulk (mine) ton	10.00	to	15.00
Domestic Coating Bulk (mine) ton	17.00	to	25.00
Imported (ship side) Bulk (lump) ton	22.00	to	30.00
Chlorine—			
Tanks cars (wks) cwt.	2.70—		
Gelatine (silicin), lb.	1.25	to	1.35
Glyc. (C.P.) drums, lb.	34.00	to	34.50
Litharge, powd. bbl. lb.	.15¾	to	.16¾

MARKET QUOTATIONS

	New York, per 100 lbs.	
Rosin (Gum)—		
E	8.80—	
F	8.80—	
G	8.80—	
WW	9.00—	
Rosin (Wood), carlots,		
F.O.B. South	4.35 to	4.50
Salt Cake—		
Dom. bulk (wks) ton	17.00 to	23.00
Imp. bulks on dock—		
(Atl. ports) ton (Nom.)	22.00—	
Soda Ash—		
Bulk (works) cwt.	**1.20—**	
Paper bags, cwt.	**1.50—**	
Soda (Caustic)—		
Solid drums, cwt.	**3.35 to**	**3.40**
Ground and flake, drums, cwt.	**3.75 to**	**3.85**
Sodium Silicate—		
60 deg. 55 gal. drums, (works) cwt.	1.60 to	1.70
40 deg. 35 gal. drums, (works), cwt.	1.30 to	1.40
Starch—		
Pearl, 140 lb. bags, cwt.	6.39—	
Pearl, barrels, cwt.	6.39—	
Paper (Sp.) bags, cwt.	6.39—	
Powdered, barrels, cwt.	6.60—	
Sulphur (Crude)		
(Mine) bulk, long ton	21.00 to	22.00
Talc—		
Dom. 100 lb. bags (mine) ton	**25.00 to**	**28.00**
Canadian	**35.00 to**	**45.00**
Titanium Dioxide—		
Barium Pig. bbls., lb.	.21 to	.21½
Calcium Pig. bbls., lb.	.21 to	.21½
Zinc Sulphide, bbls., lb.	11.50 to	11.75

WOOD PULP

The following are OPS ceiling prices on domestic wood pulp, dollars per short air dry ton delivered consuming mills including the basic maximum freight allowances as provided:

Bleached sulphite	140.00—
Unbleached sulphite	132.50—
Bleached sulphate	145.00—
Semi-bleached sulphate	140.00—
Unbleached sulphate	132.50—
Bleached soda	140.00—
Ground wood	92.50—
Sulphite screenings	72.50—
Sulphate screenings	67.50—
Ground wood screenings	60.00—
Unbleached sulphate siderurus	132.50—
Standard news print siderurs	92.50—

OPS ceiling prices on European wood pulp, dollars per short air dry ton, on dock at American Atlantic ports, follow:

Bleached sulphite	225.00—
Bleached sulphate	230.00—
Unbleached sulphite	200.00—
Unbleached sulphate	200.00—

Current quotations on imported wood pulp, dollars per short air dry ton, on dock American Atlantic ports with varying inland freight allowances follow:

Bleach. sulphite, Canadian	145.00—
Bleach. sulphite, Swedish	140.00—
Bleach. sulphite, Norwegian	140.00—
Bleach. sulphite, Finnish	140.00—
Unbl. sulphite, Canadian	130.00—
Unbl. sulphite, Swedish	115.00—
Unbl. sulphite, Finnish	120.00 to 125.00
Blch. kraft, Canadian	145.00 to 150.00
Blch. kraft, Swedish	142.50—
Unbl. kraft, Canadian	100.00 to 125.00
Unbl. kraft, Swedish	100.00—
Unbl. kraft, Finnish	105.00—

PAPER

Boards—

OPS ceiling prices (CPR 108) per ton, delivered consumer's mill, 10 tons or more:

Plain chip	90.00—
News vat lined chip	92.50—
Filled news	90.00—
Solid news	92.50—
White vat lined chip	132.50—
Chip tube and can stock	100.00—
Single manila lined chip	137.50—
Single jute lined chip	135.00—
White patent coated:	
.020	160.00—
.018	162.50—
.016	165.00—

Book Paper—

OPS ceiling prices (CPR 106) per cwt.:

Coated two sides		
70 lb. No. 2 enamel, 25x38-500, trimmed 4 sides	4 cases	$17.25
	Carloads	$16.30
45 lb. enamel, 25x38-500, trimmed 4 sides	4 cases	$13.05
	Carloads	$12.10
Uncoated		
55 lb. No. 2 offset, 25x38-500, trimmed 4 sides	4 cases	$14.80
	Carloads	$13.85
50 lb. A Grade English Finish, 25x38-500, untrimmed	4 cases	$14.05
	Carloads	$13.10
20 lb. envelope, 17x22-500, untrimmed	Carloads	$12.40
16 lb. tablet, 17x22-500	Carloads	$11.35

Rag Content Bond—

OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

	17 lbs. or heavier	16 lbs.
Extra 100% rag	57.50	53.50
100% rag	49.50	50.50
75% rag	38.00	39.00
50% rag	29.50	30.50
25% rag	24.00	25.00

Rag Content Ledger—

OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

Extra 100% rag	58.50
100% rag	50.50
85% rag	42.00
75% rag	39.50
50% rag	30.50
25% rag	25.00

Sulphite Bond—

OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

	17 lbs. or heavier	16 lbs.
Air dry bond (Watermarked)	20.00	21.00
No. 1 bond (M.F. watermarked)	15.50	16.20
No. 2 bond (M.F. watermarked)	14.90	15.60
Plain bond (M.F. unwatermarked)	14.00	14.60

Sulphite Ledger—

OPS ceiling prices (CPR 91) per cwt., f.o.b. mill:

No. 1, M.F. watermarked	16.50
No. 2, M.F. watermarked	15.90
Plain, M.F. unwatermarked	15.00

Glassine (f.o.b. mill)—

OPS base ceilings (CPR 76):	per cwt.
25 lb. base No. 1 bleached glassine	22.50—
25 lb. base No. 1 bleached greaseproof	20.00—

News—

	per ton
Rolls, Standard (Contract)	123.00 to 126.00
Rolls (Spot)	(Nominal)
Sheets	138.00—

Tissues (Carlots)—

	per ream
White No. 1	1.85—
White No. 2	1.35—
Bleached Anti-Tarnish	2.20—
Colored	2.00—
Anti-Tarnish Kraft	1.75—
Manila	2.00—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.90—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.	.90—
Toilet, Bleached (M shts.) per cs.	10.00—
Toilet, Unbleached (M shts.) per cs.	8.00—

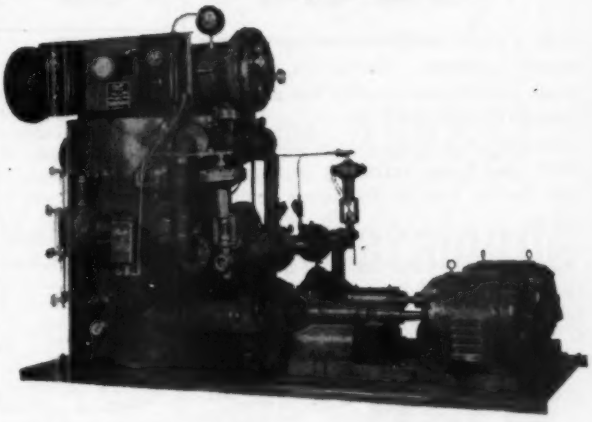
Towels

	per case
Bleached	6.80—
Unbleached	5.90—

Wrappings (Kraft)—

OPS ceilings, per cwt., 50 lb. base weight:	per cwt.
Standard wrapping	7.75—
Butchers, counter rolls	8.25—
Standard bag, mill rolls	7.50—
Shipping sack, mill rolls	7.75—
Gumming, mill rolls	8.00—
Asphalting, mill rolls	7.75—
Envelope, mill rolls	9.25—

Another Michigan mill switches to the Stickle vacuum pump



The Stickle 10-30 duplex vacuum pump shown above recently was installed in a Michigan mill to replace a vacuum pump which frequently caused costly interruptions in production. The Stickle vacuum pump, main unit of the Stickle vacuum differential drainage system, offers these four advantages:

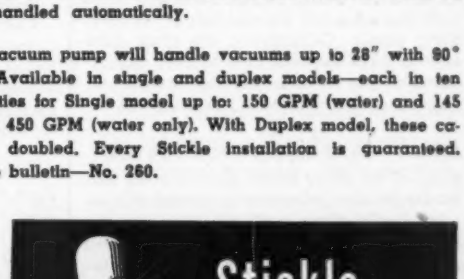
1. Higher efficiency—The Stickle vacuum pump keeps dryers free of condensate and air, returns condensate to boiler room at higher temperature.

2. Fewer failures—The Stickle vacuum pump is designed for paper mill operation where exterior temperatures and humidity are extremely high. Duplex model has duplicate pumps, motors, controls to prevent costly interruptions in case of emergency.

3. Lower cost—The Stickle vacuum pump shortens heat-up period. Built-in heat exchanger eliminates costly cooling equipment and need for adding raw water to condensate return. Standard pumps and motors are easy and inexpensive to replace.

4. Greater flexibility—The Stickle vacuum pump permits 25% pump capacity increase at small cost. Drying pressure changes may be handled automatically.

The Stickle vacuum pump will handle vacuums up to 28" with 90° condensate. Available in single and duplex models—each in ten sizes. Capacities for Single model up to: 150 GPM (water) and 145 CFM (air); or 450 GPM (water only). With Duplex model, these capacities are doubled. Every Stickle installation is guaranteed. Write for free bulletin—No. 260.

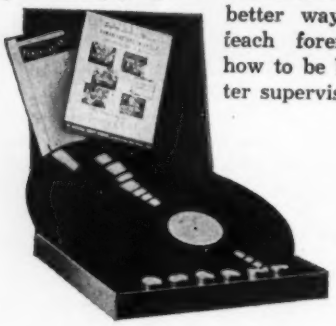


Stickle Steam Specialties Company
2215 Valley Avenue • Indianapolis 18, Indiana

PUT *ACTION* IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.



SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

Write for complete information and details to the

NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

The Paper Industry Index to Advertisers

When writing them, please mention The PAPER INDUSTRY.

Refer to the Paper and Pulp Mill Catalogue and Engineering Handbook at your mill office, for complete listing of all advertisers' products.

Advertising Council, Inc.
American Car & Foundry Co. 1290
American Hoist and Derrick Co.
American Lumber & Treating Co. 1370
Anheuser-Busch, Inc.
Anthracite Equipment Corporation
Appleton Machine Co., The
Appleton Wire Works, Inc. 1289
Appleton Woolen Mills 1309
Armour and Company 1341
Armstrong Machine Works 1300
Arnold, Hoffman & Co., Inc.
Asten-Hill Mfg. Co. 1283
Atkins Saw Div., Borg-Warner Corp.

Babcock & Wilcox Co., Tubular Products Division
Bagley & Sewall Co., The 1308
Bailey Meter Company
Barco Manufacturing Co.
Bauer Bros. Co., The 1336
Beloit Iron Works 1315
Binks Manufacturing Co. 1387
Bird Machine Company 1335
Black-Clawson Co., The
Bowser, Inc.
Bowsher Co., The N. P.
Buffalo Electro-Chemical Co., Inc. 1288

Cambridge Instrument Co., Inc. 1377
Cameron Machine Co.
Carthage Machine Co. 1391
Chicago Bridge & Iron Company 1326
Clark Equipment Company 1365
Classified Advertising 1391
Cochrane Chemical Co. 1377
Colton Chemical Company, The
Curlator Corporation 1329

DeZurik Shower Company
Diamond Iron Works, Inc.
Diamond Power Specialty Corp.
Dicalite Div., Great Lakes Carbon Corporation
Dilts Machine Works
Dings Magnetic Separator Co. 1364
Downingtown Mfg. Co. 1295
Draper Brothers Company
du Pont de Nemours & Co., E. I.

Eastwood-Nealley Corporation
Egan & Co., Frank W.
Electric Eye Equipment Co.
Electric Machinery Mfg. Co. 1312
Elliott Company
English China Clays Sales Corp. 1389

Farquhar Company, A. B.
Federal Fawick Corporation 1303
Felker Bros. Mfg. Co.
Fibre Making Processes, Inc. 1387
Fisher Governor Co.
Fiske Brothers Refining Co., Lubriplate Div.
Fitchburg Screen Plate Co., Inc.
Foxboro Company, The 1296
Fritz Publications, Inc. 1384, 1395
Fulton Iron Works Company

Garlock Packing Co., The 1368
General American Trans. Corp.
General Chemical Division, Allied Chemical & Dye Corporation 1294
General Dyestuff Corporation
Gilbert & Nash Company
Goslin-Birmingham Mfg. Co., Inc.
Goulds Pumps, Inc. 3rd Cover
Graton & Knight Co.

Hanchett Manufacturing Co. 1379
Hercules Powder Company
Hooper & Sons Co., Wm. E. 1343
Hubinger Company, The
Hudson-Sharp Machine Company 1385
Humphrey Elevator Company
Huyck & Sons, F. C. 1278

Improved Machinery Inc. 1st Cover
International Harvester Co.

Jackson & Church Company
Jeffrey Mfg. Co., The
Jenkins Bros.
Jenssen Company, Inc., G. D. 1389
Johnson Corporation, The
Jones & Sons Company, E. D. 1293

Kalamazoo Tank & Silo Co. 1387
Kelco Company 1291
Kewanee-Ross Corporation
Kuhns Brothers Company, The 1392

Langston Co., Samuel M.
Layne & Bowler, Inc.
Leeds & Northrup Company 1375
Lindsay Wire Weaving Co., The
Link-Belt Company 1304
Lockport Felt Company
Lodding Engineering Corp. 1302
Lubriplate Div., Fiske Brothers Refining Co.
Lunkenheimer Co., The 4th Cover

Magnus Metal Corporation 1382
Manchester Machine Co., The
Manhattan Rubber Division
Mason-Neilan Regulator Co. 1306
Michigan Pipe Company 1380
Michigan Steel Casting Co.
Midvale Company, The 1330
Midwest-Fulton Machine Co., The 1385
Midwest Piping & Supply Co., Inc. 1325
Milton Roy Company 1292
Modern Engraving & Machine Co.
Moore & White Co.
Morden Machines Company
Mt. Vernon-Woodberry Mills, Inc. 1318
Murray Mfg. Co., D. J.

Nash Engineering Co., The 1373
National Aluminate Corp. 1284
National Safety Council 1394
National Starch Products, Inc.
Newcomb-Detroit Co.
Nichols Engr. & Research Corp.
Noble & Wood Machine Co.
Norton Company

(Continued on facing page)

Oakite Products, Inc.
Ohio Injector Co., The
Oilgear Company, The....1297
Oldbury Electro-Chemical Co.
Oliver United Filters, Inc.
Orr Felt & Blanket Co., The

Palmer Filter Equipment Company
Pandia, Inc. 1383
Paper and Pulp Mill Catalogue....1395
Paper Industry, The....1384
Peerless Pump Div., Food Machinery & Chemical Corp.
Pennsylvania Flexible Metallic Tubing Co.
Perfecting Service Co....2nd Cover
Perkins & Son, Inc., B. F.
Permutit Company, The
Photovolt Corporation....1391
Poole Foundry & Machine Co....1379
Powell Company, The Wm....1299
Pusey & Jones Corp., The....1322-1323

Raybestos-Manhattan, Inc.
Raymond Service, Inc., Chas. P....1391
Read Standard Corporation
Red-Ray Mfg. Co., Inc.
Rice Barton Corporation....1305
Rice Barton Research Corp.
Rogers & Co., Samuel C.
Roots-Connersville Blower Div....1369
Ross Engineering Corp., J. O....1339
R-S Products Corporation....1371

Sandy Hill Iron & Brass Works....1379
Shartle Bro. Machine Co.
Shenango-Penn Mold Company....1317
Shuler & Benninghofen....1316
Smidth & Co., F. L.
Solvay Process Division, Allied Chemical & Dye Corporation
Staley Mfg. Co., A. E.
Standard Oil Co. (Indiana)....1396
Stebbins Engineering & Mfg. Co....1377
Stickle Steam Specialties Co....1393
Sutherland, Inc.
Sutherland Refiner Corp....1286-1287
Swenson Evaporator Company....1314
Swift & Company

Taylor Machine Works
Testing Machines, Inc.
Texas Gulf Sulphur Co.
Timken Roller Bearing Co....1307
Titanium Pigment Corporation
Turner Halsey Company....1318

United Iron & Metal Co....1384
U.S.A.—Treasury Dept.

Valley Iron Works Company
Vanderbilt Co., Inc., R. T....1310

Waterbury & Sons Co., H....1385
Waterbury Felt Co., The....1389
Western Precipitation Corp.
Weyerhaeuser Timber Co....1301
Whiting Corporation....1314
Williams-Gray Company
Wisconsin Wire Works....1382
Wolferz Alloy Equipment, E. C....1362
Worthington Corporation
Wyandotte Chemicals Corporation

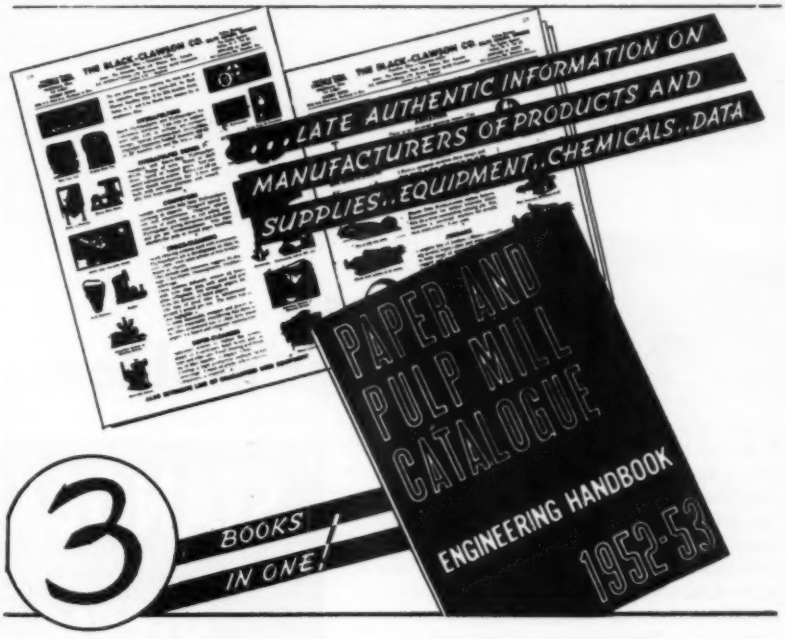
Yarnall-Waring Company
Youngstown Welding & Engineering Co., The....1391

Professional & Business Services Section
Chicago Testing Laboratory....1390
Sirrine Company, J. E....1390

It's in here!

. . . the New 1952-53

Paper and Pulp Mill Catalogue


. . . LATE AUTHENTIC INFORMATION ON MANUFACTURERS OF PRODUCTS AND SUPPLIES . . EQUIPMENT . . CHEMICALS . . DATA
PAPER AND PULP MILL CATALOGUE
ENGINEERING HANDBOOK
1952-53
3 BOOKS IN ONE!

1 . . . Manufacturers Catalogue Section . . . contains pages and inserts giving exact data on equipment.

2 . . . Buyers Service Section . . . includes a comprehensive cross-indexed list of products for this industry, and listings of responsible manufacturers and suppliers.

3 . . . Engineering Handbook . . . is an extensive source of vital facts for this industry—quick information for the industry's executives: 128 and more pages of engineering data, graphs, charts, tables, etc.

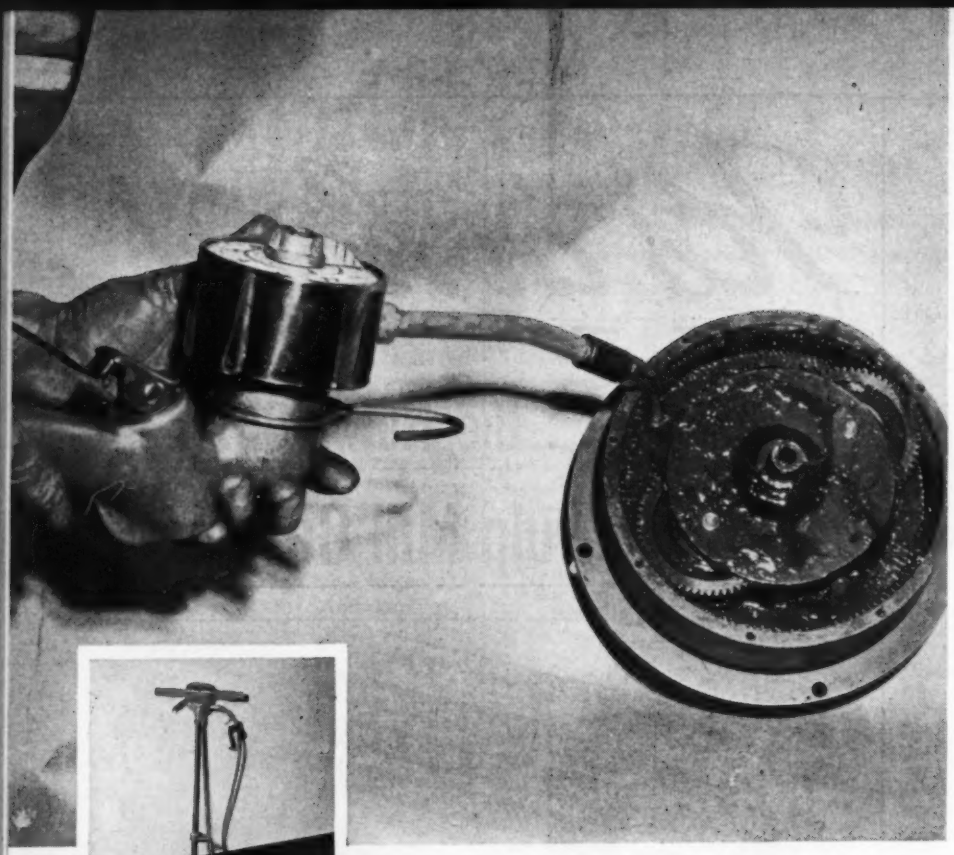
It's in your Mill Office . . . See it NOW!

Glance through this exhaustive mine of information. Read about the new equipment available. Write for manufacturers new catalogs. And, whatever your need—look for it in the PAPER AND PULP MILL CATALOGUE.

PAPER AND PULP MILL CATALOGUE *and* The PAPER INDUSTRY *monthly magazine are published by*

Fritz Publications, Inc.
431 South Dearborn Street, Chicago 5

Since 1919
the Service Organization of the Paper and Pulp Industry



Solves leakage problem . . .

● Multi-clean Products, Inc., St. Paul, Minnesota, manufactures industrial floor polishing and scrubbing machines. The machines are shipped with grease already installed in gear reduction units. The problem faced by this company was one of finding a grease that would stand up under hard service and not leak from the gear units. Greases tried either caused or threatened leakage troubles.

Called in on this problem, a Standard Oil lubrication specialist recommended STANOBAR Grease "S", a highly stable grease with a unique adhesive characteristic. Given an accelerated service test, STANOBAR did not leak from the gear unit, and its consistency showed no change that would later cause a leakage problem. There was no wear of gears or bearings. Adopted for use in the units, STANOBAR has solved this company's lubrication problem on every count. Officials have been able to eliminate the costly and troublesome practice of having all units returned to the factory, at 12 months intervals, to be repacked with grease.

STANOBAR
TRADE MARK
Grease

The same lubricating qualities of STANOBAR that solved this problem for Multi-clean Products, Inc. can serve you in a wide variety of applications. A Standard Oil lubrication specialist will be glad to discuss those applications with you. He's right there in your section of the Midwest. You need only phone your local Standard Oil office. Or write, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

What's YOUR problem?

C. L. Daub is the Standard Oil lubrication specialist who helped Multi-clean Products, Inc. solve an important lubrication problem through his recommendation of STANOBAR Grease.

Like all Standard Oil lubrication specialists, he has a broad background of practical experience plus thorough training in Standard's own schools. And like all lubrication specialists, his on-the-job assistance is always available to the industries in the immediate area he serves. He is one of a corps of experienced men who make their headquarters wherever industry is located throughout the Midwest. Call for the services of your Standard Oil lubrication specialist today. When he stops at your plant, be sure to get information on these outstanding products:

STANOIL Industrial Oils—This multi-purpose line of oils provides cleaner operation of hydraulic units, supplies effective lubrication in compressors, gear cases, and circulating systems. One of two grades can replace a wide variety of special oils and lubricants.

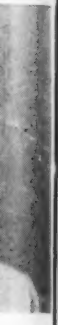
CALUMET Viscous Lubricants—On open gears and wire rope, these greases resist washing and throw-off. Their superior wetting ability affords better coating of gears and better internal lubrication of wire rope.

STANORUST Rust Preventives—The eight grades of STANORUST form one of the most complete and effective lines of rust preventives on the market today. Each has been scientifically and specially developed for its intended use. The grades range from a fingerprint remover to a heavy semi-solid that protects against corrosion for years under the most severe outdoor exposure.

STANDARD OIL COMPANY

STANDARD *(Indiana)*

UR
?



rd Oil
helped
solve
roblem
ion of

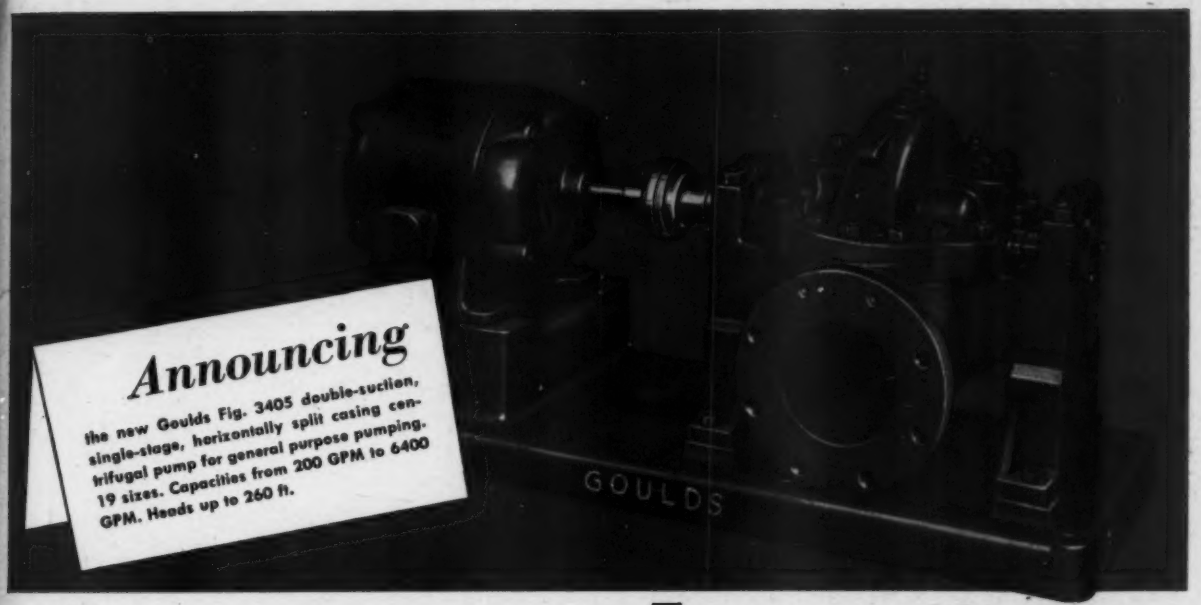
brica-
broad
xperi-
ng in
d like
is on-
avail-
e im-
is one
men
arters
cated
all for
rd Oil
When
ure to
stand-

This
ovides
raulic
brica-
s, and
f two
ariety
ts.

nts—
rope,
g and
etting
ng of
lubri-

ves—
ORUST
te and
ntives
h has
cially
e. The
rprint
-solid
cor-
under
e out-
osure.

ana)


Announcing
the new Goulds Fig. 3405 double-suction, single-stage, horizontally split casing centrifugal pump for general purpose pumping. 19 sizes. Capacities from 200 GPM to 6400 GPM. Heads up to 260 ft.
GOULDS

This new pump gives you 5 big cost advantages

The price you pay is only one element of the cost of a pump installation.

Good engineering practice also figures in the cost of pump breakdowns, low operating efficiency, change-overs to meet new conditions, replacement parts inventories, even the floor space the installation takes up.

Here's why the new Goulds centrifugal pump is designed to improve your cost experience in every one of those elements.

1. ***It combines seven design features that mean maximum operating efficiency and minimum maintenance.***

Every one of these construction features is standard with this new design. Together they offer you, without extra cost, a quality of service that's unique in its approach to general liquid handling.

a. Renewable stuffing box bushings.
b. Bearing housings sealed against moisture and dirt.
c. Cowl-type glands suitable for use with quenching liquids.
d. Stainless steel impeller keys.
e. Teflon water seal rings.
f. Die-formed stuffing box packing.
g. Corrosion resistant gland bolts.

2. ***Interchangeability of parts.***

With only three shaft and rotating parts assemblies to provide for 19 pump sizes and 38 pump combinations, this new design offers you a remarkable range of interchangeable parts. A glance at the interchangeability chart on page 7 of the descriptive bulletin will show you:

a. how this design gives you great flexibility in making field changes should your pumping requirements change;
b. why the first cost of this unit is so low due to standardization in manufacture; and
c. how this interchangeability helps to reduce spare parts inventories.

3. ***Compact construction.***

You will be particularly pleased with the short over-all length of this new design. Short bearing spans cut lengths as much as 50%. This means a real saving in floor space.

4. ***Flexibility of stuffing box.***

You can use either conventional stuffing boxes or mechanical seals depending on requirements. And you can change from one to the other in the field if need be.

5. ***Easy rotation change.***

A unique device, locking shaft seals, permits you to change from right-hand rotation to left-hand rotation or vice versa in the field without construction changes.

More than 50 years of experience in meeting industry's needs for general purpose centrifugal pumps come to a climax in this design.

GET FULL DETAILS **This 12-page illustrated bulletin, No. 721.6, covers the complete details of the new Goulds Fig. 3405, including specifications, interchangeability tables and performance curves. Be sure you have the whole cost-advantage story before you select another general purpose pump. Contact your nearest Goulds representative or mail the coupon below today.**

Goulds PUMPS INC. Seneca Falls New York

GOULDS PUMPS, INC., Dept. PI, Seneca Falls, N.Y.

Please send me Bulletin No. 721.6 describing the new Fig. 3405 centrifugal pump.

Name_____

Company_____

Address_____

City_____ State_____

ANNOUNCING
THE NEW
LUNKENHEIMER
VALVE
HANDWHEEL

"non-slip"*
for positive closing

This revolutionary "Non-Slip" Handwheel introduces another Lunkenheimer improvement! Four rounded, non-slip lugs are gripped comfortably and firmly —operator's hand can't slip, even when wet or greasy. Result: Ordinary hand leverage closes the valve tight.

The new "Non-Slip" Handwheel is cooler, too—and keeps the operator's hand away from the top of the stem, which may be hot. It's sturdier, easier to operate, and makes your valves last longer.

*Patent Pending

WRITE FOR the name of your nearest Lunkenheimer distributor. He can show you samples of Lunkenheimer Valves with the new "Non-Slip" Handwheel. See them for yourself — *test them.* The Lunkenheimer Company, Box 360S, Cincinnati 14, Ohio.

BRONZE • IRON • STEEL

LUNKENHEIMER

THE ONE *Great* NAME IN VALVES

L-152-23